Intermountain
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Research Natural Areas in the Northern Region :

A Guidebook for Scientists and Educators

Compiled by James R. Habeck

Review Draft

RESEARCH NATURAL AREAS IN THE NORTHERN REGION: A GUIDEBOOK FOR SCIENTISTS AND EDUCATORS

REVIEW DRAFT

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Introduction

Since 1927, Federal land management agencies have been actively developing a system of Research Natural Areas (RNAs) on federally owned lands. On these areas, plant communities and other natural features are protected for scientific and educational purposes. This natural area system offers biologists and other scientists unique opportunities to study biota, environments, and ecological processes in unmodified conditions.

The Northern Region of the USDA Forest Service includes more than 10 million ha (25 million acres) of forest, shrubland, and grassland in northern Idaho, Montana, North Dakota, and northwestern South Dakota. This preliminary directory describes 56 RNAs for which sufficiently detailed information was available. This total includes the 19 officially designated RNAs and 37 other areas formally proposed for RNA status in national forest plans. These 56 described RNAs are listed alphabetically by National Forest in Table 1 and are plotted, by number, on the map of the Northern Region (Figure 1). Another map (Figure 2) shows the locations of the Region's 15 National Forests. An additional 58 areas are proposed for RNA status but did not have adequate information for a description here; these areas are included (by letter code) in Table 1 and in the regional map (Figure 1). Vegetation types found in all 114 established and proposed RNAs are summarized in Table 1. Later versions of this guidebook will include all established and proposed RNAs. This draft also describes the Northern Region's three largest Wilderness areas; they too are available for appropriate scientific research. Additionally, there are many wilderness and special interest natural areas in the Northern Region and natural areas outside of the national forests which are not included in this draft, but could be described in a later version.

The purpose of this guidebook is to make these areas known to the scientific community and thereby stimulate their use for research and for baseline monitoring. Such study enhances knowledge of the characteristics and operation of natural ecosystems which, in turn, provides a basis for evaluating the effects of land management activities in similar ecological types outside of RNAs. Research activities in RNAs must be essentially nondestructive, and the scientific and educational values of the areas must not be impaired.

This review draft is made available in order to obtain comments and suggestions for improving the format and content of the subsequent edition. Written suggestions are welcomed and should be addressed to Angela Evenden, RNA Coordinator, USDA Forest Service, Northern Region, P.O. Box 7669, Missoula, MT 59807.

Framework of the RNA System

The 1983 Northern Region Guide gave specific direction for establishment of a RNA system. The region was divided into four "analysis areas"–northern Idaho, western Montana, central and eastern Montana, and North and South Dakota. In each analysis area, the goal was to establish sufficient RNAs so that, as a minimum, the following were represented: two examples of each major forest habitat type (association) and one example of each minor forest habitat type, shrubland and grassland habitat type, and each aquatic ecosystem type. Specific habitat type targets were assigned to each national forest, and a systematic process was outlined for establishing RNAs to meet these targets.

The Northern Region and the Forest Service's Intermountain Research Station have a combined Natural Area Committee that provides guidance during the evaluation process and makes recommendations on establishment and management of RNAs. The Region's Natural Area Coordinator advises the committee and carries out its recommendations. The committee cooperates with other organizations such as the Bureau of Land Management, The Nature Conservancy, State Heritage Programs, universities, and citizens' groups. Accomplishments of the Northern Region RNA program are largely a result of professional guidance and help provided by the Idaho Natural Areas Coordinating Committee, led by Charles A. Wellner; advice provided by the Montana Natural Area Committee and Montana section of the Society of American Foresters, and others interested in the establishment and use of RNAs.

The following is a summary of the status of RNAs in the Northern Region as of December 1987:

Established = 19 (signed by the Chief of the Forest Service)
Proposed = 95 (proposed in National Forest Plans)
Candidate = 29 (identified, but requiring further information and evaluation before being proposed)
Needed = 24

The latter category, for which candidate areas have not been identified, will probably be expanded to meet additional targets as a result of new riparian classifications and refined habitat type classifications in some areas.

Conducting Studies

RNAs provide a uniquely valuable system of field sites for research, baseline monitoring, and education in the natural sciences. They are publicly owned and protected examples of undisturbed ecosystems made available to the scientist. Within the Northern Region, the RNA system provides a framework of areas that will eventually represent the entire range of biological diversity available on national forests and national grasslands. Most of the RNAs are relatively accessible, with roads approaching their boundary.

The scientist can conduct research with reasonable assurance that investments in long-term studies will not be lost to logging, land development, or similar activities. Valuable inputs from other scientific disciplines can be expected as other studies are conducted on the area and knowledge of its natural features accumulates. In return, the scientist wishing to use a RNA must:

1. obtain permission from the Forest Service;
2. abide by regulations governing the use of the area and limiting the type of research activities allowed; and
3. inform the Forest Service about progress of the research, published results, and location of collected materials.

The purposes of these limitations are to insure that the scientific and educational values of the RNA are not impaired, to accumulate a body of documented knowledge about the RNA, and to avoid conflict between new and old studies.

In general, educational use should be at the upper classman or graduate college level. Some care is required even within these restrictions where large groups of students or particularly fragile natural features are involved.

Research on RNAs must be essentially nondestructive. Collection of plant and animal specimens should be restricted to the minimum necessary for research needs and in no case to a degree which significantly reduces species populations. Such collections must also be carried out in accordance with applicable State and Federal regulations.

Within these broad guidelines, the appropriate uses of RNAs are determined on a case-by-case basis. RNAs are administered by the local National Forest Ranger District. Normal management and protective activities are the responsibility of District Rangers and Forest Supervisors. But, scientific and educational uses of RNAs in the Northern Region are a responsibility of the Intermountain Research Station. Therefore, a scientist interested in using one of these areas should write the Station's Director at the Federal Building, 324 25th Street, Ogden, UT 84401 giving an outline and timetable for the proposed research activity. It is helpful if the scientist contacts the responsible District Ranger and explains his plans, prior to submitting the proposal. If extensive use of a RNA is planned, a brief cooperative agreement between the scientist and the Forest Service may be necessary to protect the investigator's work and the character of the RNA and to ensure that copies of resulting reports and publications will be provided for Forest Service RNA files.

The Forest Supervisor and District Ranger administering the affected RNA will be informed of mutually agreed upon activities by the Intermountain Station's Director. A scientist should visit the administering Ranger Station when beginning his studies to meet the ranger and review the nature, purpose, and duration of the research activities.

Research is considered an appropriate use of designated Wilderness and is provided for in the 1964 Wilderness Act. Forest Service policy encourages research that enhances knowledge of ecosystems or natural resources that could not readily be obtained in a nonwilderness setting. Research activity must not interfere with wilderness values; thus it must be conducted in an unobtrusive manner without permanent devices

or improvements. Use of motorized equipment or mechanical transport is prohibited unless the research is essential to meet minimum requirements for administration of the area as Wilderness and cannot be done another way. Researchers must contact the District Ranger responsible for the area in which research is proposed. A research proposal, including a plan of operations, will be necessary. Several of the proposed RNAs listed in Table 1 are located in existing or proposed Wilderness; thus the above regulations will also apply to them. The Station Director will coordinate with the Regional Forester on research proposals involving such areas to ensure that wilderness values are protected.

Contents of this Guidebook

The RNA descriptions in this directory are a synopsis of the RNA establishment records on file at the Northern Region headquarters, where they can be consulted for more detailed information. Most of these records for northern Idaho were prepared by Charles A. Wellner. The majority of RNA records in Montana were prepared by Janet L. Johnson (former RNA Coordinator, now with the Beaverhead National Forest) and James R. Habeck (University of Montana, Department of Botany).

The same format is used for all RNAs. Common names are used for trees, and scientific nomenclature is provided in Appendix A. Forest habitat types are designated by an abbreviation composed of the first two letters of the genus and species epithet of the tree (e.g., *Pinus ponderosa* = Pipo) and the associated undergrowth species. These are listed in Appendix B. The estimated area occupied by each habitat type and Society of American Foresters (1980) cover type is given. Grasslands, shrublands, and other non-forest vegetation types are also described. Each RNA's climatic and geologic features are summarized briefly. A key to the abbreviations used in the RNA descriptions is found in Appendix C.

A national forest map showing the geographic location and access routes accompanies each RNA description. More detailed location information can be obtained from the responsible Ranger District, and topographic maps are available from the U.S. Geological Survey and retail outlets. The descriptions of features of the Northern Region's three largest Wildernesses were prepared by Stephen F. Arno (Intermountain Research Station) . These have accompanying maps that indicate Ranger District boundaries. Detailed maps are available at the Ranger Stations, and at National Forest and Northern Region offices. U.S. Geological Survey topographic maps (scale 1:24 ,000) offer the greatest detail.

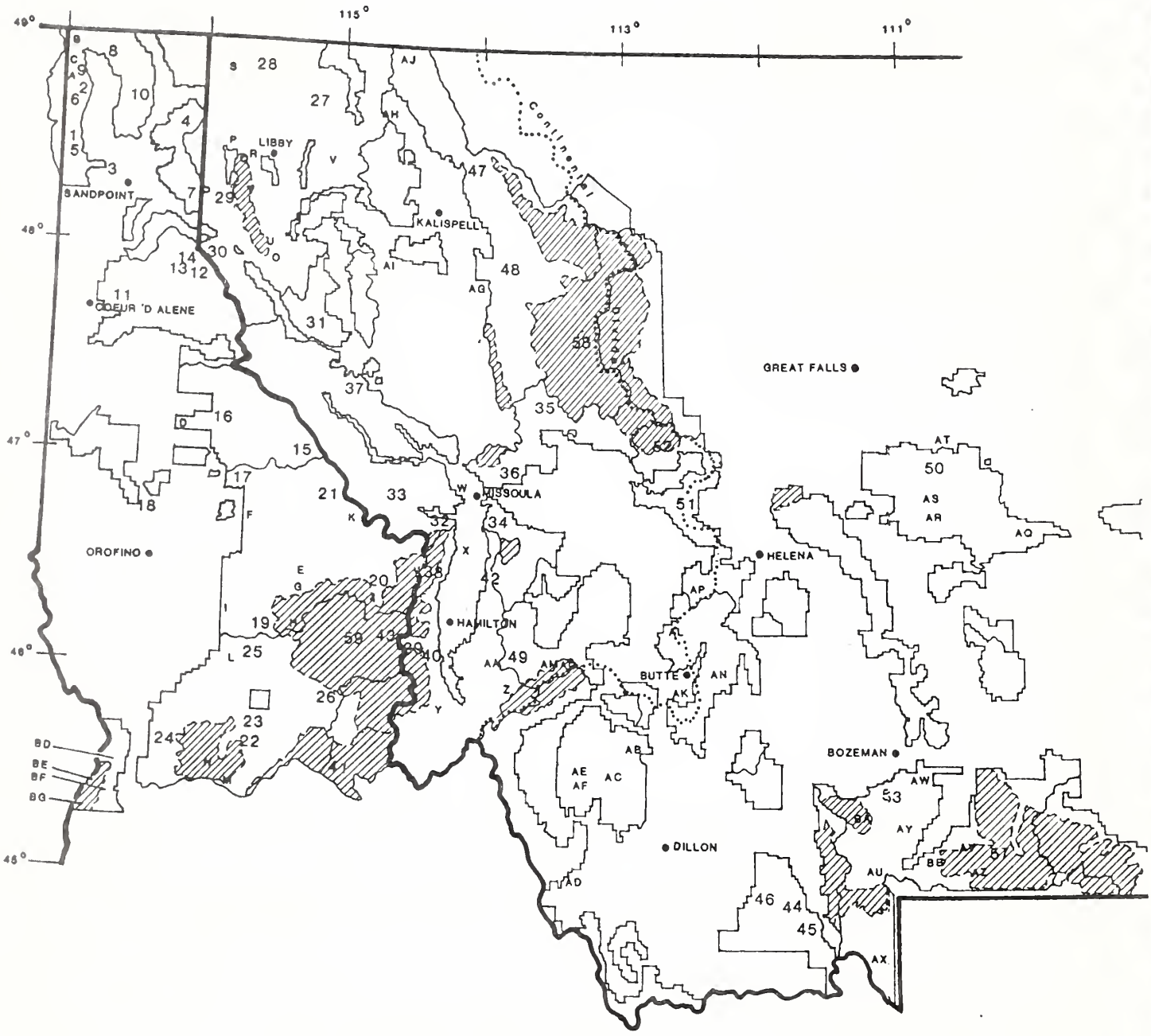


Figure 1. Established (*) and proposed Research Natural Areas in the Northern Region as of December 1987. The 56 RNAs indicated by number have descriptions in this directory, as do the Region's three largest Wildernesses (No. 57-59).

KANIKSU NATIONAL FOREST
1. Binarch Cr.
2. *Bottle Lk.
3. *Canyon Cr.
4. *Hunt Girl Cr.
5. *Kaniksu Marsh
6. Potholes
7. Scotchman No. 2
8. Smith Cr.
9. *Tepee Cr.
10. Three Ponds
A. Roundtop Mt.
B. Snowy Top
C. Upper Priest River

COUER D'ALENE NATIONAL FOREST
11. *Montford Cr.
12. Pond Pk.
13. Spion Kop
14. Upper Shoshone Cr.

SAINT JOE NATIONAL FOREST
15. Five Lakes Butte
16. *Upper Fishhook
D. Theriault Lk.

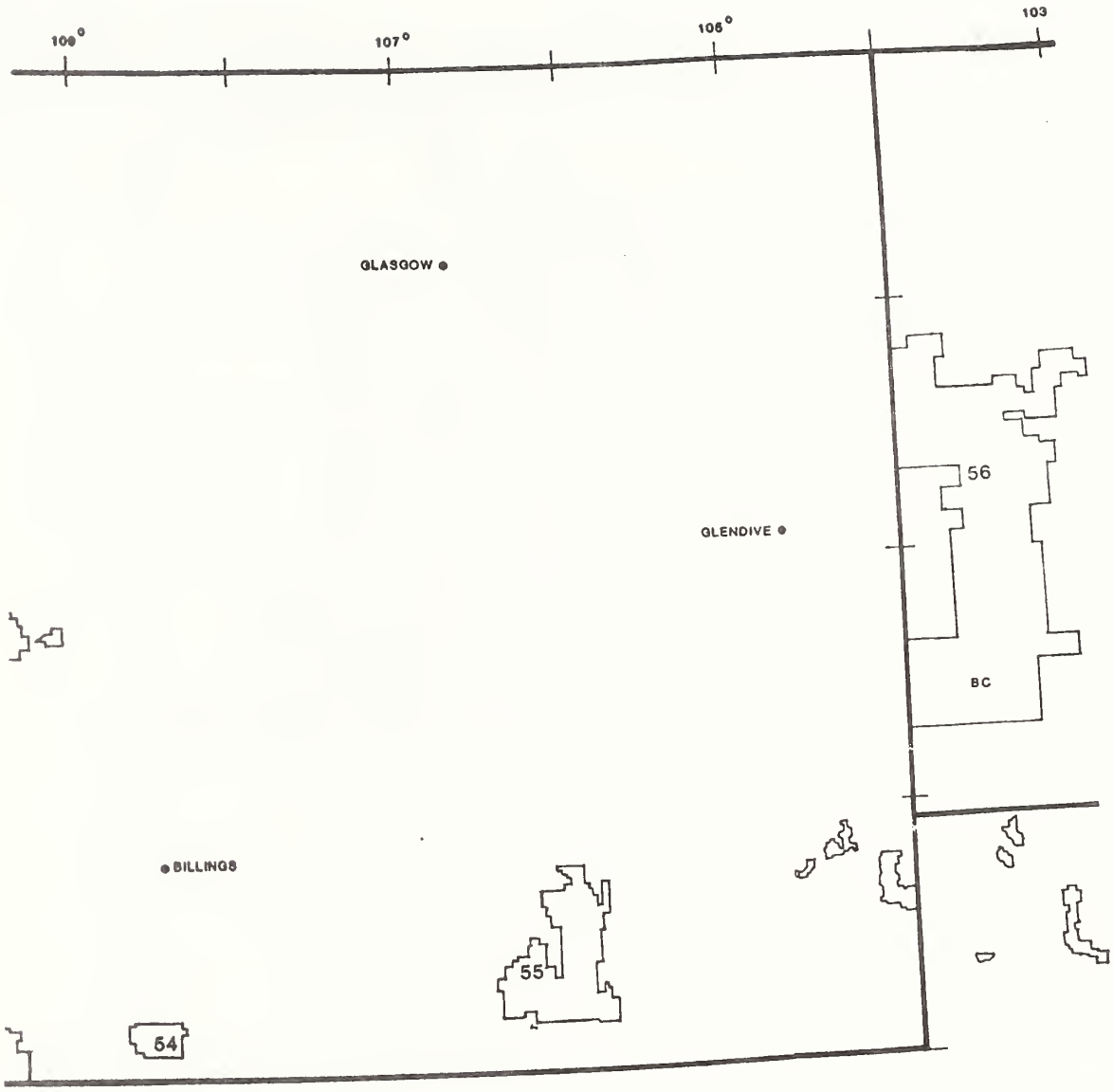
CLEARWATER NATIONAL FOREST
17. Aquarius
18. Bull Run Cr.
19. *Lochsa River
20. Sneakfoot Meadows
21. Steep Lakes
E. Bald Mt.
F. Chateau Falls
G. Dutch Cr.
H. Fenn Mt.
I. Four-Bit
J. Grave Peak
K. Rhodes Peak

NEZ PERCE NATIONAL FOREST
22. Fish Lk.
23. *Moose Meadow Cr.
24. No Business Cr.
25. *O'Hara Cr.
26. Warm Springs Cr.
L. Elk Cr.
M. Newsome Cr.
N. Square Mt Cr.
BD. Alum Beds
BE. Bills Cr.
BF. Lightning Cr.
BG. Little Granite Cr.

KOOTENAI NATIONAL FOREST
27. Big Cr.
28. Hoskins Lk.
29. Lower Ross Cr.
30. Ulm Peak
O. Bramlet Lk.
P. Falls Cr.
Q. Norman Mt.
R. Parmenter Cr.
S. Pete Cr. Meadows
T. Snowshoe Lk.
U. Wanless Lk.
V. Wolf/Weigel

LOLO NATIONAL FOREST
31. Barktable Ridge
32. *Carlton Ridge
33. *Petty Cr.
34. *Plant Cr.
35. *Pyramid Peak
36. *Sheep Mountain Bog
37. Squaw Cr.
W. Council Grove

BITTERROOT NATIONAL FOREST
38. Bass Cr.
39. Bitterroot Mountain Snow Avalanche
40. Lower Lost Horse Canyon
41. Salmon Mt. (Idaho)
42. Sawmill Cr.
43. Upper Lost Horse Canyon
X. Bitterroot River
Y. Boulder Cr.
Z. East Fork
AA. Sapphire Divide (see No. 49)



BEAVERHEAD NATIONAL FOREST
44. Cave Mt.
45. *Cliff Lk.
46. *Cottonwood Cr.
AB. Cattle Gulch
AC. Elkhorn Lakes
AD. Horse Prairie
AE. O'Dell Lk.
AF. Skull Cr. Meadows

FLATHEAD NATIONAL FOREST
47. Coram
48. Swan River
AG. East Shore
AH. Le Beau
AI. Little Bitterroot
AJ. Tuchuck

DEERLODGE NATIONAL FOREST
49. Sapphire Divide
AK. Basin Cr.
AL. Bernice
AM. Dextor Basin
AN. Dry Mt.
AO. Goat Flats
AP. Thunderbolt Mt.

LEWIS AND CLARK NATIONAL FOREST
50. Paine Gulch
AQ. Bartleson Peak
AR. Jumping Cr.
AS. Onion Park

HELENA NATIONAL FOREST
51. Granite Butte
52. Red Mt.
AT. Indian Meadows

GALLATIN NATIONAL FOREST
53. Wheeler Ridge
AU. Black Butte
AV. E Fk Mill Creek
AW. Mt Ellis
AX. Obsidian Sands
AY. Palace Butte
AZ. Passage Cr.
BA. Pioneer Lk.
BB. Sliding Mt.

CUSTER NATIONAL FOREST
54. Lost Water Canyon
55. *Poker Jim
56. *Two Top-Big Top
BC. Limber Pine

WILDERNESS
57. Absaroka-Beartooth
58. Bob Marshall complex
59. Selway-Bitterroot

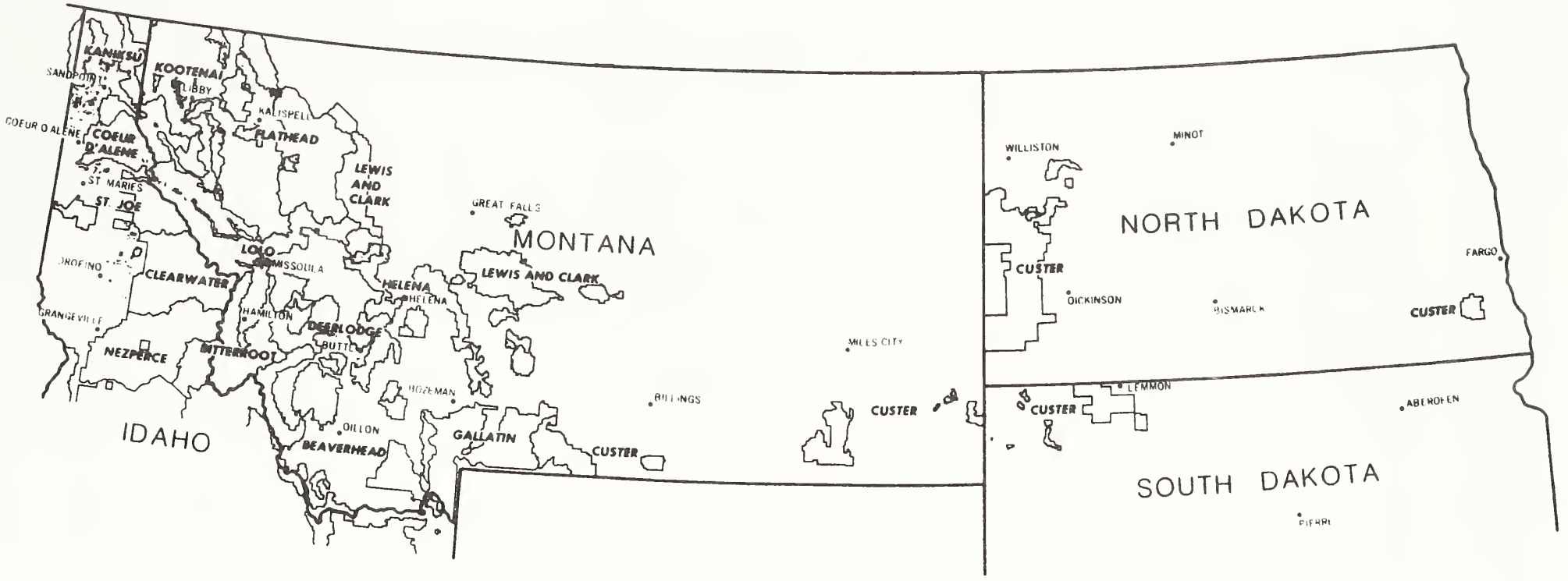


Figure 2. Location of the 15 National Forests in the Northern Region.

Table 1--List of the 19 established (*) and 95 proposed RNA's in the Northern Region (as of December 1987) indicating vegetation types found on each. The number of different aquatic types is also listed; aquatic types are type I, II, and III streams, waterfalls, beaver ponds, cold springs, rivers, permanent ponds, temporary ponds; low, average, and high productivity lakes; lakes with fish; lakes without fish; fresh marsh, shallow emergent vegetation; fresh marsh, deep; bog ponds; bog meadows; wet meadows; and thermal springs. Further information on aquatic types can be obtained from the Northern Region's RNA coordinator.

Part A--RNA's in northern Idaho National Forests: preliminary list of forest habitat types (h.t.'s) (Cooper and others 1987; Intermountain Research Station, Gen. Tech. Rep. INT-236) and other vegetation types (cover type [c.t.]) (see also 41. Salmon Mtn. in part B)

	Pinus ponderosa h.t.'s	Pseudotsuga menziesii h.t.'s	Abies grandis h.t.'s	Thuja plicata h.t.'s	Tsuga heterophylla h.t.'s	Tsuga mertensiana h.t.'s	Abies lasiocarpa h.t.'s	Timberline h.t.'s	Alpine vegetation	Populus trichocarpa c.t.
KANIKSU NF										
1. Binarch Creek	.	X	X	X	X	.	.	.	.	.
2. *Bottle Lake	.	X	X	.	X	.	.	.	.	X
3. *Canyon Creek	.	.	.	X	X	.	X	X	.	X
4. *Hunt Girl Creek	.	.	.	X	X	.	X	.	.	.
5. *Kaniksu Marsh	.	X	X	.	X	.	.	.	.	.
6. Potholes	.	.	.	X	X	.	.	.	.	X
7. Scotchman No. 2	.	.	.	.	.	.	X	X	X	.
8. Smith Creek	.	.	.	.	.	.	X	.	.	.
9. *Tapes Creek	.	X	.	X	X	.	.	.	.	.
10. Three Ponds	.	X	X	X	X	.	.	.	.	.
A. Roundtop Mountain	.	.	.	.	.	.	X	X	.	.
B. Snowy Top	.	.	.	.	.	.	X	X	X	.
C. Upper Priest River	.	.	.	X	X	.	.	.	.	X
COEUR D'ALENE NF										
11. *Montford Creek	.	.	.	.	X	.	.	.	.	.
12. Pond Peak	.	.	.	.	.	X	.	.	.	.
13. Spion Kop	.	.	X	.	X	.	.	.	.	X
14. Upper Shoshone Creek	.	.	X	.	X	X	X	.	.	.
ST. JOE NF										
15. Five Lakes Butte	.	.	.	.	.	X	X	.	.	.
16. *Upper Fishhook	.	.	.	X	.	.	.	.	.	.
D. Theriault Lake	.	.	.	.	.	X	X	.	.	.
CLEARWATER NF										
17. Aquarius	.	X	X	X	.	.	.	.	.	.
18. Bull Run Creek	.	X	X	X	.	.	.	.	.	.
19. *Lochsa	.	X	X	X	.	.	.	.	.	.
20. Sneakfoot Mdws	.	.	.	.	.	.	X	.	.	.
21. Steep Lakes	.	.	.	.	.	X	X	.	.	.
E. Bald Mountain	.	.	.	.	.	X	.	.	.	.
F. Chateau Falls	.	X	X	X	.	.	.	.	.	.
G. Dutch Creek	.	.	X	X	.	.	.	.	.	.
H. Fenn Mountain	.	.	.	.	.	.	.	X	X	.
I. Four-Bit	.	.	.	X	.	.	.	.	.	.
J. Grave Peak	.	.	.	.	.	.	X	X	X	.
K. Rhodes Peak	.	.	.	.	.	.	.	X	X	.
NEZPERCE NF										
22. Fish Lake	.	X	.	.	.	.	X	.	.	.
23. *Moose Meadow Creek	.	.	.	.	.	.	X	.	.	.
24. No Business Creek	X	X	X	.	.	.	X	.	.	.
25. *O'Hara Creek	.	X	X	X	.	.	X	.	.	X
26. Warm Springs Creek	.	X	X	X	.	.	.	.	.	.
L. Elk Creek	X	X	X	.	.	.	X	X	.	.
M. Newsome Creek	.	.	X	.	.	.	.	.	.	.
N. Square Mountain	.	.	.	.	.	.	X	.	.	.
BD. Alum Beds	X	.	.	.	.	.	.	.	.	.
BE. Bills Creek	X	.	.	.	.	.	.	.	.	.
BF. Lightning Creek	X	X	.	.	.	.	.	.	.	X
BC. Little Granite Creek	X	X	X	.	.	.	X	X	X	X

Continued

Table 1, Part A--(Continued)

	Alnus rubra c.t.	Celtis reticulata c.t.	Cercocarpus ledifolius c.t.	Agropyron spicatum c.t.	Festuca idahoensis c.t.	Festuca viridula c.t.	Xerophyllum tenax c.t.	Number of aquatic types
KANIKSU NF								
1. Binarch Creek	.	.	.	.	.	.	.	3
2. *Bottle Lake	.	.	.	.	.	.	.	3
3. *Canyon Creek	.	.	.	.	.	X	X	3
4. *Hunt Girl Creek	.	.	.	.	.	.	.	6
5. *Kaniksu Marsh	.	.	.	.	.	.	.	5
6. Potholes	.	.	.	.	.	.	.	8
7. Scotchman No. 2	.	.	.	.	.	.	.	4
8. Smith Creek	.	.	.	.	.	.	.	7
9. *Tepee Creek	.	.	.	.	.	.	.	4
10. Three Ponds	.	.	.	.	.	.	.	4
A. Roundtop Mountain	.	.	.	.	.	X	X	0
B. Snowy Top	.	.	.	.	.	X	X	4
C. Upper Priest River	.	.	.	.	.	.	.	2
COEUR D'ALENE NF								
11. *Montford Creek	.	.	.	.	.	.	.	3
12. Pond Peak	.	.	.	.	.	.	.	2
13. Spion Kop	.	.	.	.	.	.	.	5
14. Upper Shoshone Creek	.	.	.	.	.	X	.	6
ST. JOE NF								
15. Five Lakes Butte	.	.	.	.	.	.	.	4
16. *Upper Fishhook	.	.	.	.	.	.	.	5
D. Theriault Lake	.	.	.	.	.	.	.	3
CLEARWATER NF								
17. Aquarius	X	.	.	.	.	.	.	7
18. Bull Run Creek	.	.	.	X	X	.	.	1
19. *Lochsa	X	.	.	.	.	.	.	3
20. Sneakfoot Mdws	.	.	.	.	.	.	.	4
21. Steep Lakes	.	.	.	.	.	.	.	6
E. Bald Mountain	.	.	.	.	.	X	X	0
F. Chateau Falls	.	.	.	X	.	.	.	3
G. Dutch Creek	.	.	.	.	.	.	.	2
H. Fenn Mountain	.	.	.	.	.	.	.	3
I. Four-Bit	.	.	.	.	.	.	.	2
J. Grave Peak	.	.	.	.	.	.	.	3
K. Rhodes Peak	.	.	.	.	.	.	.	1
NEZPERCE NF								
22. Fish Lake	.	.	.	.	.	.	.	3
23. *Moose Meadow Creek	.	.	.	.	.	.	.	4
24. No Business Creek	.	.	X	X	.	.	.	2
25. *O'Hara Creek	.	.	.	.	.	.	.	8
26. Warm Springs Creek	.	.	.	.	.	.	.	2
L. Elk Creek	.	.	X	.	.	.	.	6
M. Newsome Creek	.	.	.	.	.	.	.	2
N. Square Mountain	.	.	.	.	.	.	.	4
BD. Alum Beds	.	X	.	X	X	.	.	2
BE. Bills Creek	.	X	.	.	.	.	.	2
BF. Lightning Creek	.	.	.	X	X	.	.	2
BG. Little Granite Creek	.	X	X	X	X	.	.	10

Table 1, Part B--RNA's in western and central Montana National Forests: preliminary list of forest habitat types (h.t.'s) (Pfister and others 1977, Intermountain Research Station, Gen. Tech. Rep. INT-34) and other vegetation types (cover type [c.t.])

	Forested scree	Pinus flexilis h.t.'s	Pinua ponderosa h.t.'a	Pseudotsuga menziesii h.t.'s	Picea h.t.'s	Abies grandis h.t.'s	Thuja plicata h.t.'s	Tsuga heterophylla h.t.'s	Tsuga mertensiana h.t.'s	Abies lasiocarpa h.t.'s	Pinus contorta h.t.'s	Larix lyallii h.t.'s
KOOTENAI NF												
27. Big Creek	.	.	.	X	.	.	.	.	.	.	.	.
28. Hoskins Lake	.	.	.	X	X	.	X	.	.	.	.	.
29. Lower Ross Creek	X	.	.	X	.	.	X	X	.	.	.	.
30. Ulm Peak	.	.	.	.	.	.	.	.	X	X	.	.
O. Bramlet Lake	.	.	.	.	.	.	.	.	.	.	.	.
P. Falls Creek	.	.	.	.	.	.	.	.	.	.	.	.
Q. Norman Mountain	.	.	.	X	.	.	.	.	.	.	.	.
R. Parmenter Creek	.	.	.	.	.	.	.	.	.	.	.	.
S. Pete Creek Mdws	.	.	.	.	.	.	.	.	.	.	.	.
T. Snowshoe Lake	.	.	.	.	.	.	.	.	.	.	.	.
U. Wanless Lake	.	.	.	.	.	.	.	.	.	.	.	.
V. Wolf/Weigel	.	.	.	X	.	.	.	.	.	X	.	.
LOLO NF												
31. Barktable Ridge	.	.	.	.	.	.	.	.	X	.	.	.
32. *Carlton Ridge	.	.	.	.	.	.	.	.	.	X	.	X
33. *Petty Creek	.	.	.	X	.	X	.	.	.	.	.	.
34. *Plant Creek	.	.	.	X	.	.	.	.	.	.	.	.
35. *Pyramid Peak	.	.	.	X	.	.	.	.	.	X	.	.
36. *Sheep Mtn. Bog	.	.	.	X	.	.	.	.	.	.	.	.
37. Squaw Creek	X	.	.	X	.	.	.	.	.	.	.	.
W. Council Grove	.	.	.	.	.	.	.	.	.	.	.	.
BITTERROOT NF												
38. Bass Creek	.	.	.	.	.	X	.	.	.	X	.	.
39. Bitterroot Mtn. Snow Avalanche	.	.	.	.	.	.	.	.	.	X	.	.
40. Lower Lost Horse Cnyn.	.	.	.	X	.	.	X	.	.	X	.	.
41. Salmon Mtn. (Idaho)	X	.	.	.	.	.	.	.	.	X	.	X
42. Sawmill Creek	.	.	X	X	.	.	.	.	.	.	.	.
43. Upper Lost Horse Cnyn.	.	.	.	.	.	.	.	.	.	X	.	X
X. Bitterroot River	.	.	.	.	.	.	.	.	.	.	.	.
Y. Boulder Creek	.	.	.	X	.	.	.	.	.	X	.	.
Z. East Fork	.	.	.	.	.	.	.	.	.	.	.	.
AA. Sapphire Divide (also on Deerlodge NF)	.	.	.	.	.	.	.	.	.	X	.	X
BEAVERHEAD NF												
44. Cave Mountain	.	.	.	X	.	.	.	.	.	X	.	.
45. *Cliff Lake	.	.	.	X	X	.	.	.	.	.	.	.
46. *Cottonwood Creek	.	.	.	.	.	.	.	.	.	.	.	.
AB. Cattle Gulch	.	.	.	.	.	.	.	.	.	.	.	.
AC. Elkhorn Lakes	.	.	.	.	.	.	.	.	.	X	.	.
AD. Horse Prairie	.	.	.	.	.	.	.	.	.	.	.	.
AE. O'Dell Lake	.	.	.	.	.	.	.	.	.	X	.	.
AF. Skull Creek Mdws.	.	.	.	.	.	.	.	.	.	X	.	.
FLATHEAD NF												
47. Coram	.	.	.	X	.	.	.	.	.	X	.	.
48. Swan River	.	.	.	.	.	X	X	.	.	.	.	.
AG. East Shore	.	.	.	X	.	X	.	.	.	.	.	.
AH. Le Beau	.	.	.	.	.	.	.	.	.	.	.	.
AI. Little Bitterroot	.	.	.	.	.	.	.	.	.	.	.	.
AJ. Tuchuck	.	.	.	.	.	.	.	.	.	X	.	.
DEERLODGE NF												
49. Sapphire Divide	.	.	.	.	.	.	.	.	.	.	.	X
AK. Basin Creek	.	.	.	.	X?	.	.	.	.	.	.	.
AL. Bernice	.	.	.	X	.	.	.	.	.	X	.	.
AM. Dexter Basin	.	.	.	.	.	.	.	.	.	X	.	X?
AN. Dry Mountain	.	.	.	X	.	.	.	.	.	.	.	.
AO. Goat Flats	.	.	.	.	.	.	.	.	.	.	.	.
AP. Thunderbolt Mountain	.	.	.	.	.	.	.	.	.	X	.	.
LEWIS AND CLARK NF												
50. Paine Culch	X	X	.	X	.	.	.	.	.	X	.	.
AQ. Bartleson Peak	.	.	.	.	X	.	.	.	.	.	.	.
AR. Jumping Creek	.	.	.	.	X	.	.	.	.	.	.	.
AS. Onion Park	.	.	.	.	.	.	.	.	.	X	.	.
HELENA NF												
51. Granite Butte	.	.	.	.	.	.	.	.	.	X	.	.
52. Red Mountain	X	X?	.	X	.	.	.	.	.	X	.	X
AT. Indian Mdws.	.	.	.	X?	X	.	.	.	.	X	.	.
GALLATIN NF												
53. Wheeler Ridge	.	.	.	.	.	.	.	.	.	X	.	.
AU. Black Butte	.	.	.	.	.	.	.	.	.	X	.	.
AV. E. Fork Mill Creek	.	.	.	X	X	.	.	.	.	X	.	.
AW. Mount Ellis	.	.	.	X	.	.	.	.	.	X	.	.
AX. Obsidian Sands	.	.	.	.	.	.	.	.	.	.	X	.
AY. Palace Butte	.	.	.	.	.	.	.	.	.	X	.	.
AZ. Passage Creek	.	.	.	X	X	.	.	.	.	X	.	.
BA. Pioneer Lakes	.	.	.	.	X	.	.	.	.	.	.	.
BB. Sliding Mountain	.	.	.	.	X	.	.	.	.	.	.	.

Table 1, Part B--(Continued)

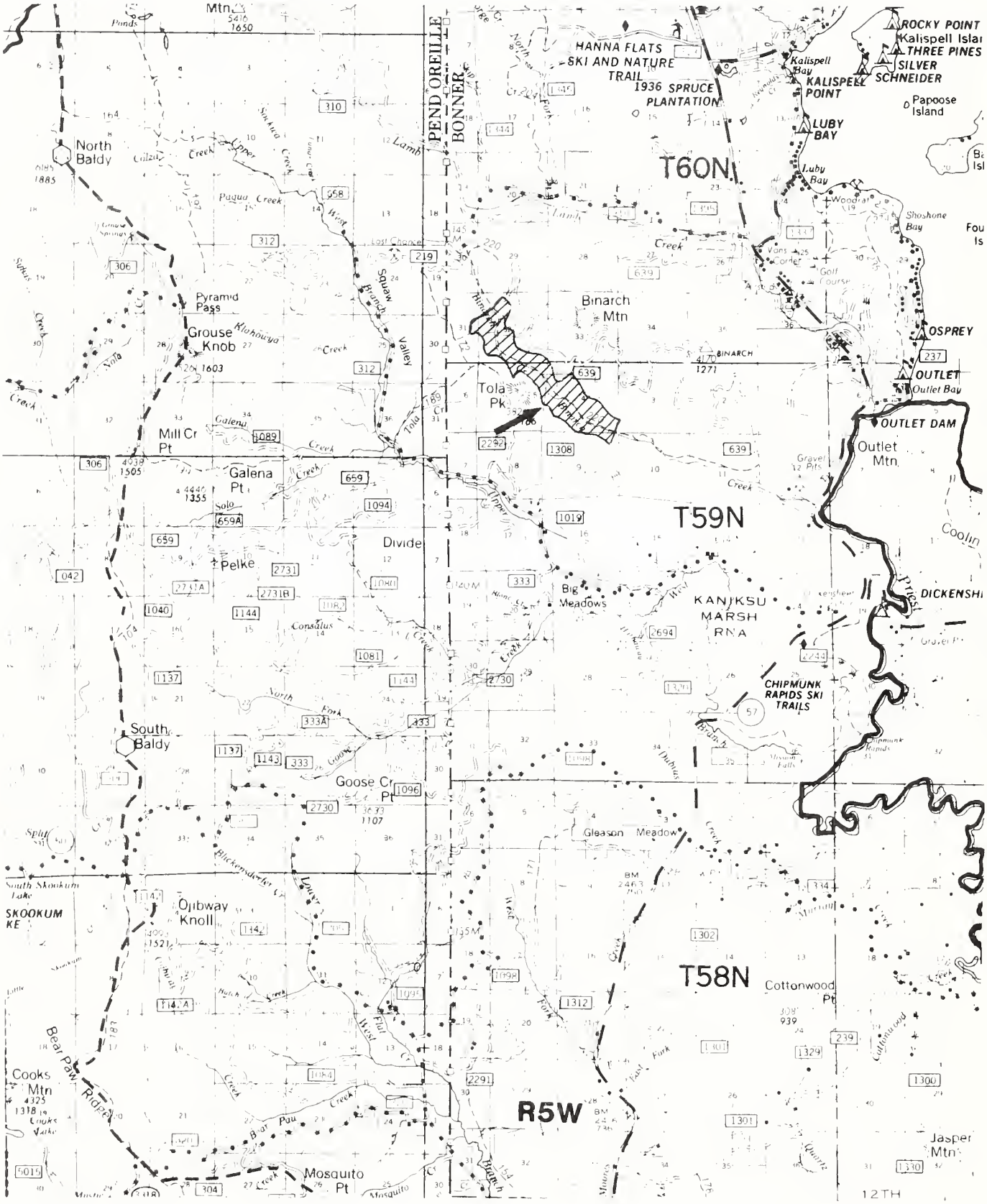
	Pinus albicaulis c.t.	Alpine vegetation	Populus trichocarpa c.t.	Agropyron spicatum c.t.	Festuca idahoensis c.t.	Festuca scabrella c.t.	Festuca viridula c.t.	Deschampsia cespitosa c.t.	Artemisia tridentata c.t.	Cercocarpus ledifolius c.t.
KOOTENAI NF										
27. Big Creek	.	.	.	.	.	.	.	.	.	.
28. Hoskins Lake	.	.	.	.	.	.	.	.	.	.
29. Lower Ross Creek	.	.	.	.	.	.	.	.	.	.
30. Ulm Peak	.	.	.	.	.	.	.	.	.	.
O. Bramlet Lake	.	.	.	.	.	.	.	.	.	.
P. Falls Creek	.	.	.	.	.	.	.	.	.	.
Q. Norman Mountain	.	.	.	.	.	.	.	.	.	.
R. Parmenter Creek	.	.	X	.	.	.	.	.	.	.
S. Pete Creek Mdws.	.	.	.	.	.	.	.	.	.	.
T. Snowshoe Lake	.	.	.	.	.	.	.	.	.	.
U. Wanless Lake	.	.	.	.	.	.	.	.	.	.
V. Wolf/Weigel	.	.	X	.	.	.	.	.	.	.
LOLO NF										
31. Barktable Ridge	.	.	.	.	.	.	.	.	.	.
32. *Carlton Ridge	X	.	.	.	.	.	.	.	.	.
33. *Petty Creek	.	.	.	.	.	.	.	.	.	.
34. *Plant Creek	.	.	.	.	.	.	.	.	.	.
35. *Pyramid Peak	.	.	.	.	.	.	.	.	.	.
36. *Sheep Mtn. Bog	.	.	.	.	.	.	.	.	.	.
37. Squaw Creek	.	.	.	.	.	.	.	.	.	.
L. Council Grove	.	.	X	.	.	.	.	.	.	.
BITTERROOT NF										
38. Basa Creek	.	.	.	.	.	.	.	.	.	.
39. Bitterroot Mtn. Snow Avalanche	X	.	.	.	.	.	.	.	.	.
40. Lower Lost Horse Cnyn.	X	.	.	.	.	.	.	.	.	.
41. Salmon Mtn. (Idaho)	X	.	.	.	.	.	X	.	.	.
42. Sawmill Creek	.	.	.	X	X	X?	.	.	.	.
43. Upper Lost Horae Cnyn.	.	.	.	.	.	.	.	.	.	.
X. Bitterroot River	.	.	X	.	.	.	.	.	.	.
Y. Boulder Creek	X	.	.	.	.	.	.	.	.	.
Z. East Fork	.	.	.	.	.	.	.	.	.	.
AA. Sapphire Divide (also on Deerlodge NF)	X	.	.	.	.	.	.	.	.	.
BEAVERHEAD NF										
44. Cave Mountain	X	.	.	.	X	.	.	.	.	.
45. *Cliff Lake	.	.	.	.	X	.	.	.	.	.
46. *Cottonwood Creek	.	.	.	.	.	.	.	.	X	.
AB. Cattle Gulch	.	.	.	.	.	.	.	.	.	X
AC. Elkhorn Lakes	X	.	.	.	.	.	.	.	.	.
AD. Horse Prairie	.	.	.	.	.	.	.	.	X	.
AE. O'Dell Lake	X	.	.	.	.	.	.	.	.	.
AF. Skull Creek Mdws.	.	.	.	.	.	.	.	.	.	.
FLATHEAD NF										
47. Coram	.	.	.	.	.	.	.	.	.	.
48. Swan River	.	.	.	.	.	.	.	.	.	.
AG. East Shore	.	.	.	.	.	.	.	.	.	.
AH. Le Beau	.	.	.	.	.	.	.	.	.	.
AI. Little Bitterroot	.	.	.	.	.	.	.	.	.	.
AJ. Tuchuck	.	X	.	.	.	.	.	.	.	.
DEERLODGE NF										
49. Sapphire Divide	X	.	.	.	.	.	.	.	.	.
AK. Basin Creek	.	.	.	.	.	.	.	.	.	.
AL. Bernice	.	.	.	.	.	.	.	.	.	.
AM. Dexter Basin	X	.	.	.	.	.	.	.	.	.
AN. Dry Mountain	.	.	.	.	X	.	.	.	X	.
AO. Cost Flats	.	X	.	.	.	.	.	.	.	.
AP. Thunderbolt Mountain	.	.	.	.	.	.	.	.	.	.
LEWIS AND CLARK NF										
50. Paine Gulch	.	.	.	.	.	.	.	.	.	.
AQ. Bartleson Peak	.	.	.	.	.	.	.	.	.	.
AR. Jumping Creek	.	.	.	.	.	.	.	.	.	.
AS. Onion Park	.	.	.	.	.	.	.	X	.	.
HELENA NF										
51. Granite Butte	X	.	.	.	.	X	.	.	.	.
52. Red Mountain	X	X	.	.	.	.	.	.	.	.
AT. Indian Mdws.	.	.	.	.	.	.	.	.	.	.
GALLATIN NF										
53. Wheeler Ridge	X	.	.	.	.	.	.	.	.	.
AU. Black Butte	X	.	.	.	X	.	.	.	.	.
AV. E. Fork Mill Creek	.	.	.	.	.	.	.	.	.	.
AW. Mount Ellis	.	.	.	.	.	.	.	.	.	.
AX. Obsidian Sands	.	.	.	.	.	.	.	.	.	.
AY. Palace Butte	X	.	.	.	.	.	.	.	.	.
AZ. Passage Creek	.	.	.	.	.	.	.	.	.	.
BA. Pioneer Lakes	.	.	.	.	.	.	.	.	.	.
BB. Sliding Mountain	.	.	.	.	.	.	.	.	.	.

Table 1, Part C--RNA's in eastern Montana and North Dakota National Forests and Grasslands: preliminary list of vegetation cover types (c.t.)

	Juniperus scopulorum c.t.	Pinus flexilis c.t.	Pinus ponderosa c.t.	Pseudotsuga menziesii c.t.	Abies lasiocarpa c.t.	Agropyron smithii c.t.	Andropogon gerardii c.t.
CUSTER NF							
54. Lost Water Canyon	.	.	.	X	X	.	.
55. *Poker Jim	.	.	X	.	.	.	.
56. *Two Top-Big Top	.	.	.	.	.	X	.
BC. Limber Pine	X	X	.	.	.	.	X

	Andropogon scoparius c.t.	Festuca idahoensis c.t.	Stipa comata c.t.	Artemisia cana c.t.	Artemisia tridentata c.t.	Rhus aromatica c.t.	Number of aquatic types
CUSTER NF							
54. Lost Water Canyon	.	.	.	.	.	.	1
55. *Poker Jim	.	X	.	.	.	X	.
56. *Two Top-Big Top	X	.	.	X	X	.	.
BC. Limber Pine	X	.	X	.	.	.	.

BINARCH CREEK PROPOSED RNA



1. BINARCH CREEK PROPOSED RESEARCH NATURAL AREA

This RNA consists of a low gradient stream, with beaver dams and ponds, inhabited by a very pure strain of westslope cutthroat trout, and adjacent steep forested slopes. Both active and senescent ponds are present, plus riparian marshes and wet meadows.

****

The Binarch Ck Research Natural Area (BC-RNA) occupies a total of 267 ha (660 acres) in northern ID. The area contains aquatic and riparian features and values including a meandering stream, senescent and active beaver dams and ponds, riparian wetlands, a high diversity of aquatic plants and animals, and one of the few remaining populations of pure westslope cutthroat trout (Salmo clarkii lewisii). Sixteen aquatic and semi-aquatic plant species, and 34 invertebrate species have been collected from the BC-RNA.

The riparian vegetation types harbor numerous species of amphibians, reptiles, birds and mammals. The surrounding slopes are heavily forested; logging has occurred outside the RNA but not within. Conifers present include: western white pine, western hemlock, Douglas-fir, and grand fir.

BC-RNA is located on the Priest Lake District, Kaniksu National Forest, Bonner Co., ID: 48° 30' N. lat., 117° 00' W. long. BC-RNA is mapped on four 7.5' Quadrangles: Galena Point, Gleason Mountain, Priest Lake, and Outlet Bay.

ACCESS AND ACCOMMODATIONS

The BC-RNA may be reached from Priest river, ID (Hwys # 2 and # 57): go north on hwy # 57 48 km (30 miles) to FR # 310 up Lamb Ck; follow FR # 310 for 7.3 km (4.5 miles) to juncture with FR # 219; continue on # 219 for 0.8 km (0.5 miles) to head of Trail # 220; follow trail for 1.9 km (1.2 miles) to northern boundary of BC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Binarch Ck RNA is located in the upper reaches of Binarch Ck which occupies a section of a flat valley floor 4.5 km (2.8 miles) in length. The valley width varys from a few meters to over 100 meters. The valley gradient is 1-3 % in the ponded areas; the stream is stepped. Adjacent slopes are over-steepened in places ranging from 35-70 %. The rocks include undifferentiated argillites, siltites of the Precambrian Belt Supergroup, plus rocks of the Kaniksu batholith. The valley floor is underlain by Pleistocene glacial materials.

BC-RNA has a moist, inland maritime climate but summers are sunny and dry; winters are cloudy and moist, surrounding mountains receive heavy snowfall. Some continental climate influence is also present. The Priest River Experimental Station is the nearest weather station, 21 km (13 miles) southeast of BC-RNA. Mean annual temperature is 6.2° C (43.1° F); mean annual precipitation is 78.5 cm (31"), with 60% of this coming as snow.

ECOLOGIC VALUES

The following habitat and community types are found in the BC-RNA:

Psme/Phma ht	[41 ha/100 acres]
Abgr/Clun ht	[16 ha/ 40 acres]
Thpl/Clun ht	[6 ha/ 15 acres]
Thpl/Atfi ht	[2 ha/ 5 acres;
Tshe/Clun ht	[140 ha/345 acres]
Stream/ponds	[6 ha/ 15 acres]
Wet Meadows	[24 ha/ 60 acres]
Rocklands	[32 ha/ 80 acres]

The SAF Forest Cover Types:

210: Douglas-fir	[41 ha/100 acres]
224: W. hemlock	[67 ha/165 acres]
228: W. redcedar	[t ha/ t acres]
215: W. white pine	[81 ha/200 acres]
213: Grand fir	[16 ha/ 40 acres]

Representative shrub species include: Acer glabrum, Alnus incana, Cornus stolonifera, Rubus parviflorus, Holodiscus discolor, Pachistima myrsinites and Vaccinium globulare.

Aquatic plant genera include: ALGAE: Vaucheria and Prasiola; BRYOPHYTES: Marchantia, Fontinalis, Scouleria, and Homolothecium; VASCULAR: Equisetum, Mimulus, Sparganium, Carex, Ranunculus, Galium, Mentha, Callitriche, and Potomogeton.

Mammals believed to occupy the BC-RNA area include:

- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- Beaver - Castor canadensis
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Coyote - Canis latrans
- Elk - Cervus canadensis

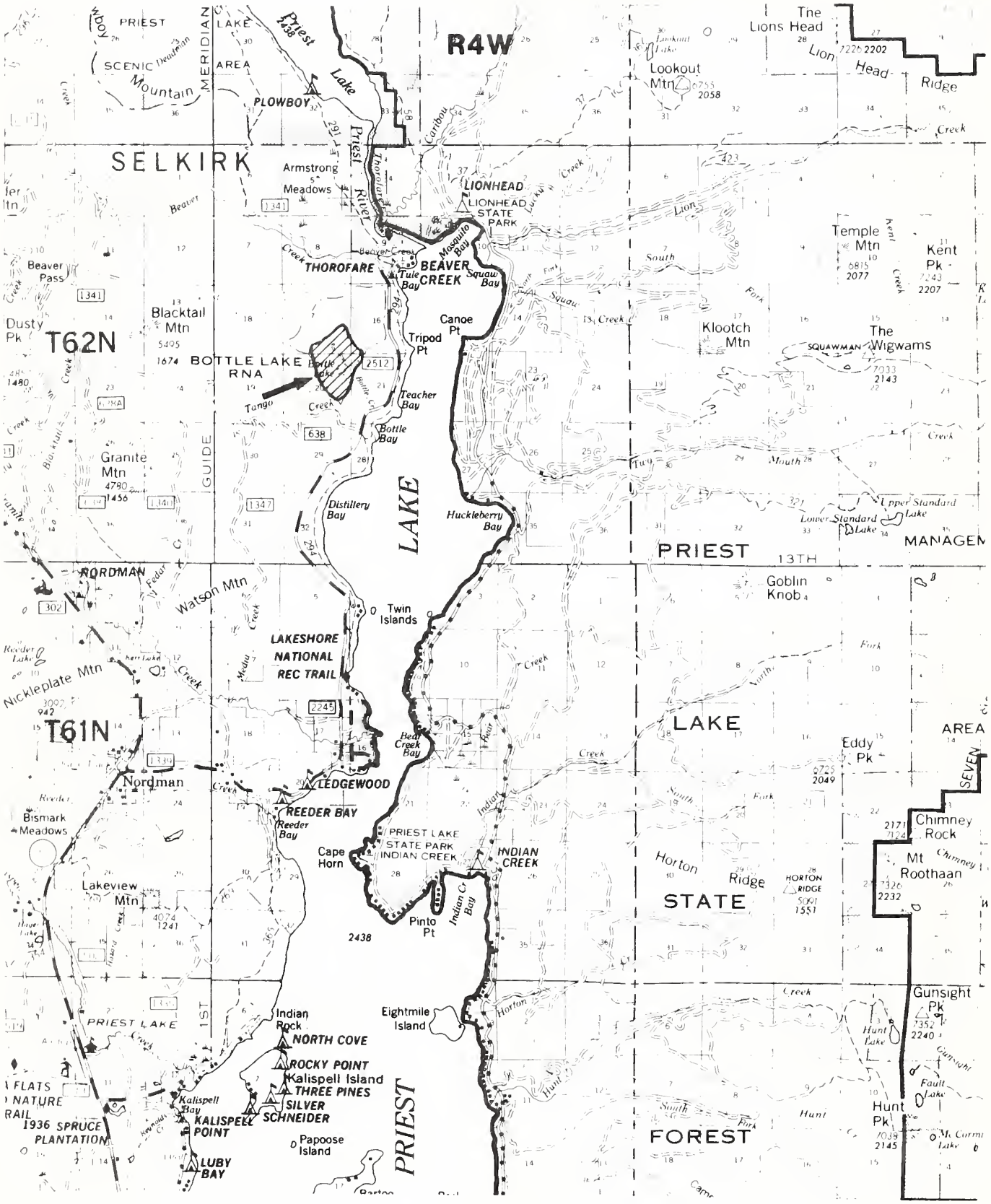
Avifauna include:

- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus

Aquatic invertebrates collected include genera from the following groups:

Ephemeroptera (mayflies), Coleoptera (beetles), Hemiptera (true bugs), Pleccoptera (stoneflies), Trichoptera (caddisflies), Diptera (flies), Planaria, and Hyalella.

BOTTLE LAKE RNA



2. BOTTLE LAKE

RESEARCH NATURAL AREA

The primary feature of importance for this RNA is a sphagnum bog composed of open water and muskeg, covering about 6 ha (15 acres). A later stage wet meadow is also included. These wetlands are surrounded by oldgrowth western redcedar and western hemlock forests, including a good population of western white pine.

****

The Bottle Lake Research Natural Area (BL-RNA) occupies a total of 105 ha (260 acres) in northern ID. Its most important value is a sphagnum bog lake. It is believed to be to be fed by underwater springs, as well as surface and groundwater runoff. Bottle Lake was probably formed originally as a kettle lake in the period of post-Wisconsin glaciation.

Furthermore, the lake and drainage have been modified by beaver (Castor canadensis) activity. The densities of alder and black cottonwood have changed with changes in beaver populations. The lake and surrounding wetlands support numerous plankton, macrophytes, and a wide variety of macroinvertebrates.

Western white pine was dominant on the site before infection by blister rust (Cronartium ribicola) killed many of them. The loss of white pine has been followed by an increased coverage by other conifers: western redcedar, western hemlock, and grand fir. A severe wind storm in 1976-77 blew down many of the trees, although much of the windthrow involved taller western white pines.

BL-RNA is located on the Priest Lake District, Kaniksu National Forest, Bonner Co., ID: 48° 43' N. lat., 116° 53' W. long. The area is mapped on the Priest Lake NW and Priest Lake NE Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

BL-RNA may be reached from Nordman, ID, (State Hwy # 57) 58 km (36 miles) north of Priest River, ID; eastward to Reeder Bay on Priest Lake, and then north on the West Shore Road to turnoff at Tango Ck Rd. Follow Tango Ck Rd 1.6 km (1 mile) to logging road bearing to the right; proceed on this road 0.4 km (1/4 mile) across creek and continue for another 0.4 km (1/4 mile); continue on foot another 0.8 km (1/2 mile) to reach west side of Bottle Lake.

PHYSICAL AND CLIMATIC CONDITIONS

Bottle Lake has an elevation of 872 m (2860'); the lowest point within BL-RNA is 853 m (2800') below the lake's outlet; the highest is 1027 m (3368') on the west boundary.

Granitic rocks are prominent in the area, but all of the area was subject to glacial action and a veneer of windblown soil mantles BL-RNA. Soils range from shallow and rocky to deep and productive. This RNA is within the inland maritime climatic zone; it is cool and moist: July averages: 17.9° C (64.3° F), Jan. averages: -4.8° C (23.4° F) and average annual is 6.6° C (43.8° F). Annual precipitation is 85 cm (33.5").

ECOLOGIC VALUES

The following forest habitat types are found in the BL-RNA:

Tshe/Clun ht	[91 ha/224 acres]
Abgr/Clun ht	[4 ha/ 10 acres]
Psme/Phma ht	[4 ha/ 10 acres]
Nonforest	[6 ha/ 16 acres]

The SAF Forest Cover Types:

215: W. white pine	[75 ha/184 acres]
227: Cedar-hemlock	[16 ha/ 40 acres]
213: Grand fir-larch	[4 ha/ 10 acres]
210: Douglas-fir	[4 ha/ 10 acres]
Lake & Muskeg	[6 ha/ 16 acres]

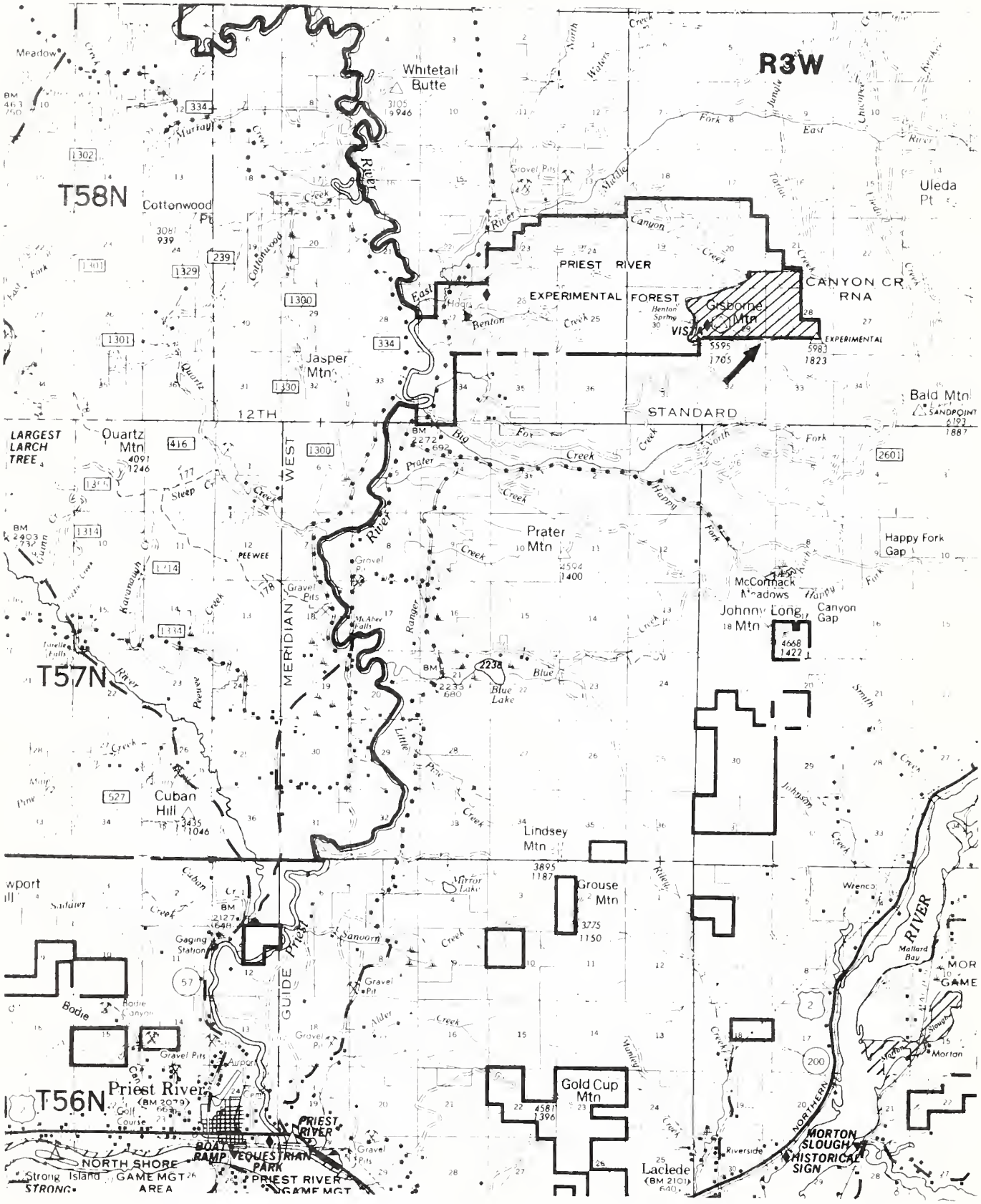
Common shrub species include:
Acer glabrum, Alnus incana, Berberis repens, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus scopulina, Holodiscus discolor, Rosa gymnocarpa, Philadelphus lewisii, Vaccinium membranaceum, V. ovalifolium, Physocarpus malvaceus, and Sambucus racemosa.

Common herbaceous species include
Athyrium filix-femina, Adenocaulon bicolor, Botrychium virginianum, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Erythronium grandiflorum, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Monotropa uniflora, Mitella stauropetala, Aralia nudicaulis, Pyrola asarifolia, Asarum caudatum, Actaea rubra, and Xerophyllum tenax.

Forty-five mammals are listed in the BL-RNA Establishment Record, including:
Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

CANYON CREEK RNA



3. CANYON CREEK

RESEARCH NATURAL AREA

Located within the Priest River Experimental Forest in northern ID, this RNA features old growth "white pine type" dominated by western redcedar and western hemlock. Subalpine fir-Engelmann spruce forests plus green fescue grasslands are also well represented in this RNA.

****

The Canyon Ck Research Natural Area (CC-RNA) occupies a total of 395 ha (977 acres) within the Priest River Experimental Forest, located in northern ID's Selkirk Mtns. It has served as a RNA since 1937. The forests are near climax stands of western hemlock and redcedar, plus western white pine, grand fir, Douglas-fir, and western larch. The subalpine zone forests are composed of subalpine fir, Engelmann spruce, lodgepole pine, and whitebark pine.

An upper south slope supports a grassland "bald" dominated by green fescue (Festuca viridula) and patches of beargrass (Xerophyllum tenax). There are extensive rock-slides throughout the CC-RNA. Several natural springs serve as the origins of several of the stream systems, including Canyon Ck. The latter stream has a moderately steep gradient and supports two rare aquatic insects.

CC-RNA is located in the southeastern corner of the Priest River Experimental Forest, Priest Lake District, Kaniksu National Forest, Bonner Co., ID: 48° 21' N. lat., 116° 45' W. long. CC-RNA is mapped within the Prater Mountain and Happy Fork Gap Quadrangles, 7.5' series. It is also documented on Experimental Forest maps.

ACCESS AND ACCOMMODATIONS

The CC-RNA may be reached by employing Experimental Forest roads during the snow-free period. the Experimental Forest headquarters are located 24 km (15 miles) north of the town of Priest River, on the main road between Priest River and Coolin, ID. The immediate area surrounding Gisborne Mtn. lookout is excluded from the CC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Canyon Ck RNA's highest point is on the ridge near the old Experimental Lookout at 1820 m (5970'); the lowest point is at the point where Canyon Creek flows from the RNA at 1265 m (4150'). The terrain is rugged; slopes range from gentle to very steep. Soils are derived from Precambrian rock, overlain with loess and volcanic ash.

CC-RNA has an inland maritime climate. Summers are sunny and dry; July-Aug. are peak fire-danger months. Winters are cloudy and moist, and exhibit deep snow. Experimental Station climatic data: January temperature averages -4° C (24° F); mean July temperature is 18.2° C (65° F). Average annual precipitation is 82 cm (32").

ECOLOGIC VALUES

The following forest habitat types are found in the CC-RNA:

Thpl ht types	[8 ha/ 20 acres]
Tshe/Clun ht	[101 ha/250 acres]
Other Tshe types	[44 ha/110 acres]
Abla/Mefe ht	[122 ha/300 acres]
Abla/Xete ht	[61 ha/150 acres]
Other Abla types	[24 ha/ 60 acres]
Abla-Pial ht	[2 ha/ 5 acres]
Feid-Fesc ht	[7 ha/ 17 acres]

The SAF Forest Cover Types:

215: W. white pine	[12 ha/ 30 acres]
227: Cedar-hemlock	[121 ha/300 acres]
224: W. hemlock	[16 ha/ 40 acres]
228: W. redcedar	[10 ha/ 25 acres]
210: Douglas-fir	[4 ha/ 10 acres]
208: Whitebark pine	[2 ha/ 5 acres]
206: Spruce-fir	[187 ha/460 acres]

Representative shrub species include: Acer glabrum, Alnus sinuata, Berberis repens, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus scopulina, Holodiscus discolor, Rosa nutkana, Philadelphus lewisii, Vaccinium membranaceum, V. scoparium, Physocarpus malvaceus, Sambucus melanocarpa, Menziesia ferruginea, Oplopanax horridum, Phyllodoce empetriformis, and Rhododendron albiflorum.

Common herbaceous species include Athyrium filix-femina, Adenocaulon bicolor, Botrychium virginianum, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Erythronium grandiflorum, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Gymnocarpium dryopteris, Mitella stauropetala, Aralia nudicaulis, Pyrola asarifolia, Asarum caudatum, Actaea rubra, and Xerophyllum tenax.

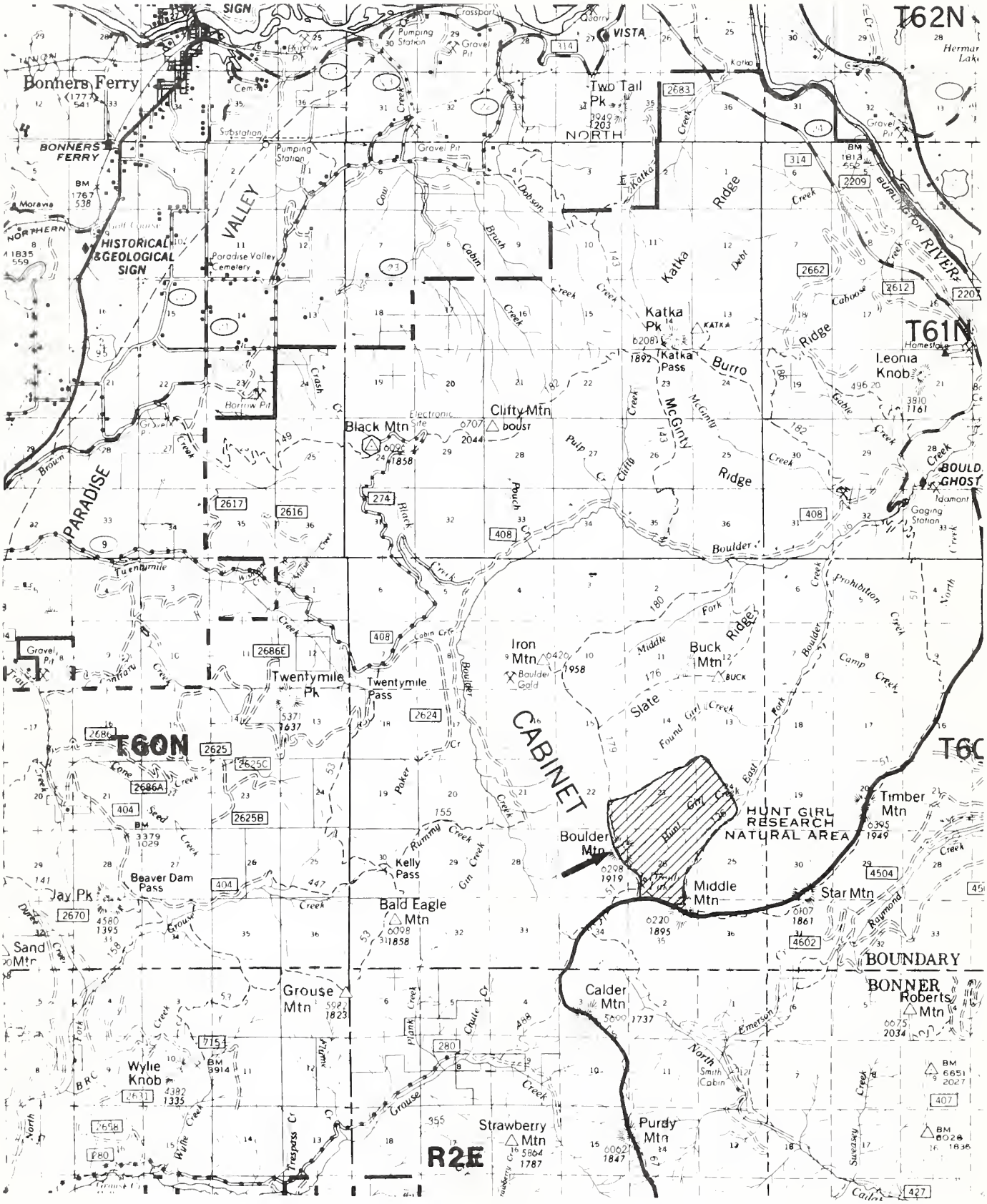
Mammals believed to occupy the CC-RNA area include:

- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- Beaver - Castor canadensis
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Coyote - Canis latrans

Avifauna include:

- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus
- Hawks - Falco and Cirus
- Dipper - Cinclus mexicanus

HUNT GIRL CREEK RNA



4. HUNT GIRL CREEK

RESEARCH NATURAL AREA

This RNA features a variety of geologic, aquatic and vegetation formations, spanning the montane to upper subalpine zones in northern ID. The area was ice scoured during Pleistocene, leaving a rugged topography. The upper slopes support subalpine fir and lodgepole pine forests; the lowest elevations have western hemlock, western redcedar, and western larch. Grizzly bears inhabit the area.

****

The Hunt Girl Ck Research Natural Area (HGC-RNA; 609 ha/1505 acres) features forest habitat types within the subalpine fir climax series; in addition to fir, there is whitebark pine and Engelmann spruce. Fires dating back to 1910 gave rise to forests currently dominated by mature lodgepole pine. The highest points within HGC-RNA are Boulder Mtn at 1908 m (5488') and Middle Mtn at 1885 m (6220'). The lowest point is at 1180 m (3900') at the NE boundary. The wide elevational range encompasses both timberline and mid-montane zones. The latter features forests in the cedar-hemlock zone, dominated by western redcedar, western hemlock, western whitepine, western larch, and grand fir. The HGC-RNA exhibits a small subalpine lake, a narrow gorge, several wet meadows, boulder fields and talus areas, plus snow avalanche tracks. Bed rock has scratches from glacial ice action.

The HGC-RNA is located on the Bonners Ferry District, Kaniksu National Forest, Boundary Co., ID, in the Cabinet Mtns.: 48° 32' N. lat., 116° 10' W. long. The area is mapped within the Clifty Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to the HGC-RNA is from the Twentymile Ck Rd # 408 reached from Naples, ID, located 18 km (11 miles) south of Bonners Ferry. In the vicinity of Twentymile Pass a route is taken to the Boulder Ck Rd # 427; this road to taken to its end where Trail # 51 is taken directly to Divide Lake within HGC-RNA. Other trails provide access along the RNA upper ridge boundaries.

PHYSICAL AND CLIMATIC CONDITIONS

This part of the Cabinet Mountains reflect Pleistocene glaciation, with scoured cirques and steep cliffs. The streams have cut through deep glacio-fluvial deposits. Fault dips, synclines, and anticlines are all present within the HGC-RNA.

The RNA experiences a strong inland maritime climate, with the mountains intercepting an abundance of moisture. The highest points receive 200 cm (80") annually, mostly as snow in winter and early spring. Mean annual temperature at the highest sites are near 0° C (32° F); winters are cloudy (30% possible sunshine); summers reach 80% possible sunshine. The nearest weather station is at Priest River Exp. Station 56 km (35 miles) west of HGC-RNA.

ECOLOGIC VALUES

The following forest habitat types are found on the HGC-RNA:

Thpl/Atfi	ht	[9 ha/ 26 acres]
Thpl/Opho	ht	[32 ha/ 80 acres]
Tshe/Pamy	ht	[32 ha/ 80 acres]
Abla/Clun	ht	[163 ha/406 acres]
Abla/Mefe	ht	[173 ha/424 acres]
Abla/Xete	ht	[81 ha/200 acres]
Abla/Luhi	ht	[119 ha/295 acres]

The forests fit into the following SAF Types:

206: Spruce-Fir	[415 ha/1025 acres]
218: Lodgepole pine	[121 ha/ 300 acres]
224: W. hemlock	[37 ha/ 90 acres]
228: W. redcedar	[36 ha/ 90 acres]

Major shrub species in HGC-RNA are: Acer glabrum, Alnus sinuata, Amelanchier alnifolia, Cassiope mertensiana, Kalmia microphylla, Pachistima myrsinites, Ribes lacustre, Sorbus sitchensis, Juniperus communis, Rubus parviflorus, Phyllodoce empetriformis, Vaccinium scoparium, V. globulare, V. myrtillus, and V. membranaceum.

Representative groundlayer species: Athyrium filix-femina, Boykinia major, Carex nigricans, Cheilanthes gracillima, Clintonia uniflora, Cryptogramma crispa, Disporum hookeri, Dryopteris filix-mas, Luzula hitchcockii, Festuca viridula, Epilobium alpinum, Gymnocarpium dryopteris, Xerophyllum tenax, Saxifraga arguta, Erythronium grandiflorum, Oplopanax horridum, and Veratrum viride.

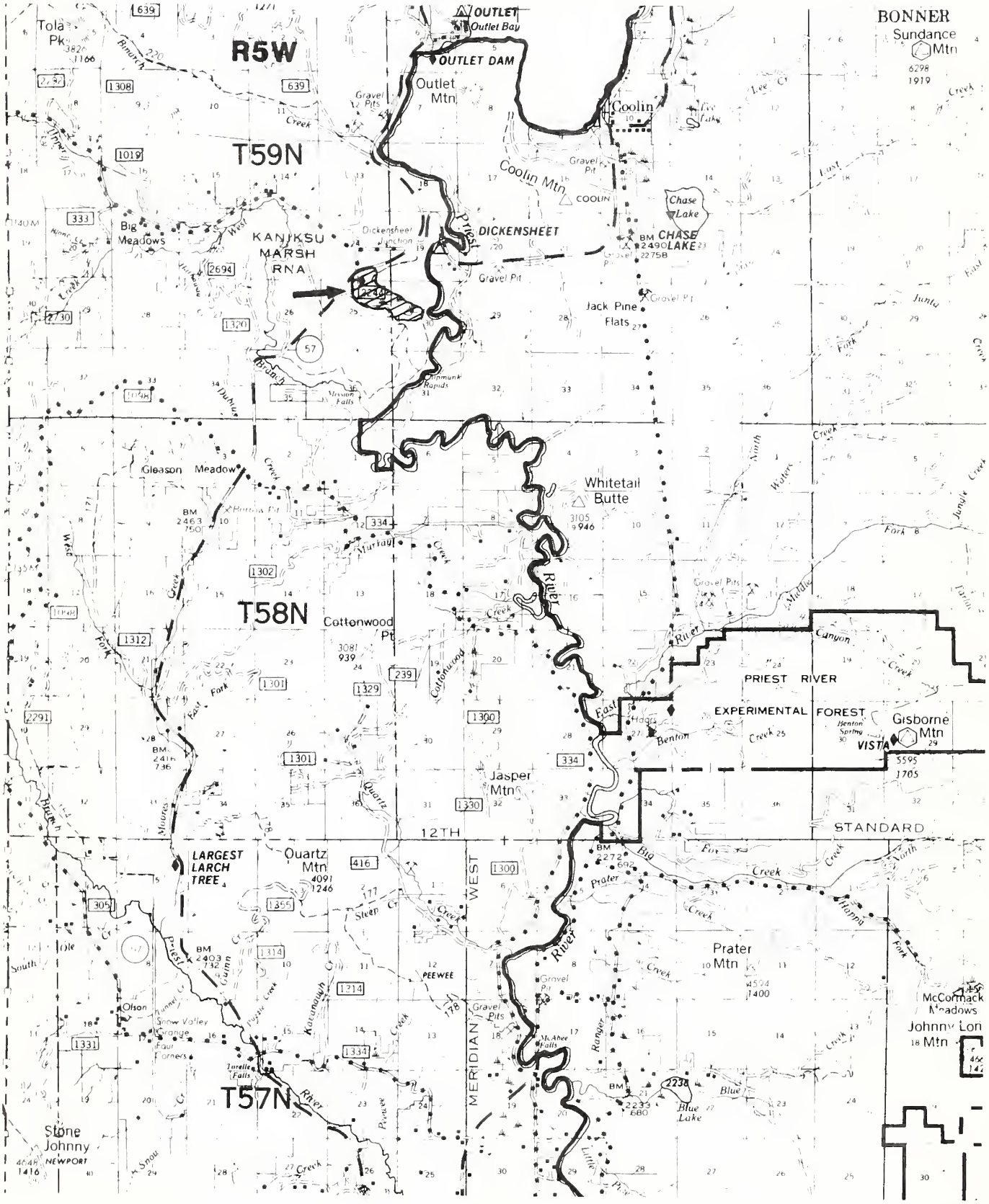
Representative mammals using the HGC-RNA include:

- Grizzly Bear - Ursus arctos
- Elk - Cervus canadensis
- W-t. deer - Odocoileus virginianus
- Black bear - Ursus americanus
- Pika - Ochotona princeps
- Hoary marmot - Marmota caligata
- N. pocket gopher - Thomomys talpoides
- Snowshoe Hare - Lepus americanus
- Big brown bat - Eptesicus fuscus

Birds utilizing the HGC-RNA:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites
- Blue grouse - Dendragapus
- Golden eagle -Aqulia chrysaetos
- Cliff swallow -Petrochelidon pyrrhonota
- Water pipit - Anthus spinoletta

KANIKSU MARSH RNA



5. KANIKSU MARSH

RESEARCH NATURAL AREA

Kaniksu Marsh is a low elevation wetland of unusual size, diversity, and compositional integrity in the lower Priest River valley in northern Idaho. It supports several unusual plant species, and is the only RNA in Idaho where the painted turtle has been observed. Many stages of wetland succession are present.

****

The Kaniksu Marsh Research Natural Area (KM-RNA) occupies a total of 79 ha (195 acres) of marshland and adjacent upland forest. The marsh has not been disturbed, but partial cutting of western white pine and ponderosa pine took place in the 1940's. The marsh covers 36 ha (90 acres) and is about 2 m (6') deep, with submergent aquatic plants surrounding an "island" of emergent vegetation. Beaver lodges are present in the area.

KM-RNA marshland grades into Engelmann spruce and western hemlock bog forest, into sphagnum-bog and progressively into drier bog birch and alder communities and finally a forest setting at the upper end of the RNA. Both old-growth and second-growth forests exist, composed of ponderosa pine, western white pine, western larch, grand fir, western hemlock, western redcedar, Engelmann spruce and lodgepole pine.

KM-RNA is the only natural area in Idaho that supports a population of the painted turtle (Chrysemys picta). A few unusual plant species are also present. The spruce-hemlock/clubmoss bog forest association is also unusual.

KM-RNA is located on the Priest Lake District, Kaniksu National Forest, Bonner Co., ID: 48° 26' N. lat., 116° 55' W. long. The area is mapped on the Outlet Bay Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The KM-RNA is reached by ID Route # 57, 35 km (22 miles) north of Priest River, ID, or 2 km (1.2 miles) south of the intersection of # 57 with the Dickensheet Rd to Coolin. At this latter point follow logging road SE along edge of bench above the marsh; an older road takes one to the eastern edge of the RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Kaniksu Marsh has an elevation of 738 m (2420'); the site represents a depression in glaciofluviatile terrace deposits of Quaternary age, and its crescent shape suggests an ancient river oxbow; the marsh is surrounded by forested hills and ridges.

KM-RNA is elevated about 24-30 m (80-100') above the level of Priest River. The area experienced two episodes of glacier advance and retreat. The nearest climatic station is at the Priest River Experimental Forest, 11 km (7 miles) SE of KM-RNA. The climate features a strong maritime element, although summers are dry. Mean annual temperature: 6.2° C (43.1 F); mean annual precipitation is 78 cm (31").

ECOLOGIC VALUES

The following forest habitat types are found in the KM-RNA:

Psme/Phma	ht	[2 ha/ 5 acres]
Abgr/Clun	ht	[4 ha/ 10 acres]
Tshe/Clun	ht	[36 ha/ 90 acres]
Marsh/wetland		[36 ha/ 90 acres]

The SAF Forest Cover Types:

215: W. white Pine	[27 ha/ 65 acres]
218: Lodgepole pine	[2 ha/ 5 acres]
227: Cedar-hemlock	[12 ha/ 30 acres]
237: Ponderosa pine	[2 ha/ 5 acres]

Common shrub species include: Amelanchier alnifolia, Alnus incana, Berberis repens, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Betula glandulosa (reaching heights of 5-6 m/ 15-18'), Holodiscus discolor, Rosa gymnocarpa, Vaccinium membranaceum, Symphoricarpos albus, Physocarpus malvaceus, Sambucus racemosa, and Prunus virginiana.

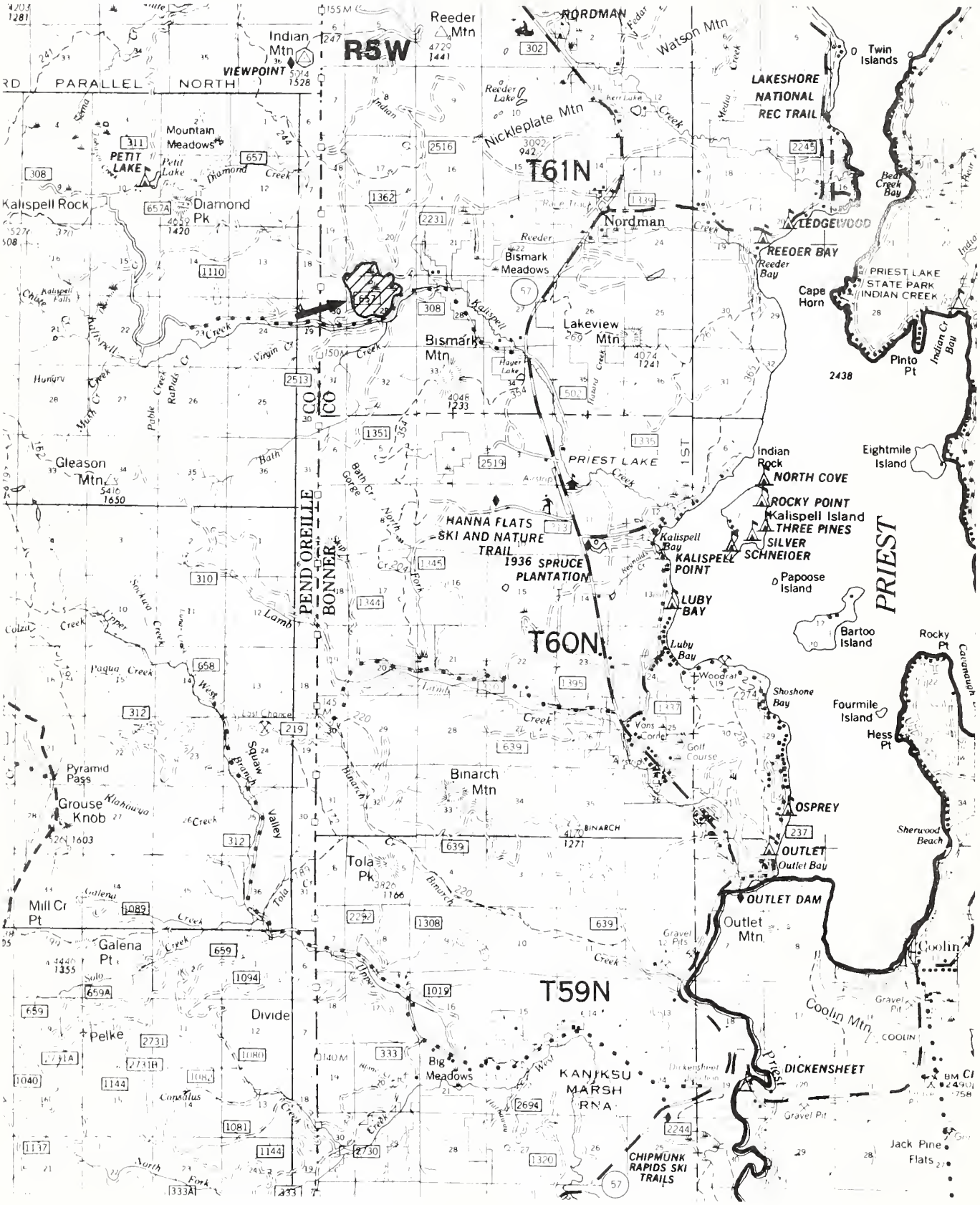
Common herbaceous species include: Achillea millefolium, Adenocaulon bicolor, Agrostis alba, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Erythronium grandiflorum, Gymnocarpium dryopteris, Galium triflorum, Goodyera oblongifolia, Mentha arvensis, Mitella stauropetala, Drosera rotundifolia, Pteridium aquilinum, Asarum caudatum, Actaea rubra, and Tiarella ovatum.

Aquatic plants include species within the following genera: Alisma, Brasenia, Callitriche, Ceratophyllum, Eleocharis, Nuphar, Potamogeton, and Utricularia.

Mammals listed for the KM-RNA include:
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Beaver - Castor canadensis
Red squirrel - Tamiasciurus hudsonicus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Heron - Ardea herodias
Nighthawk - Chordeiles minor

POTHOLES PROPOSED RNA



6. POTHOLES PROPOSED

RESEARCH NATURAL

AREA

Located in Idaho's panhandle, this RNA is an example of a diverse aquatic, wetland area, resulting from Pleistocene glaciation; the potholes are surrounded by conifer forests dominated by western hemlock, with redcedar and western white pine as common associates. An upwelling cold spring is present, supplying water to wet meadows and bogs. A variety of rare plant species occur in this RNA.

****

Potholes Research Natural Area (P-RNA) covers 117 ha (290 acres) in northern Idaho. This RNA includes a variety of aquatic elements, rare plants, common and rare plant communities, and an abundance of bird and mammal species characteristic of wetland ecosystems. Spring ponds, bog ponds, marshes, and beaver ponds are present. Marshes with sitka alder, bog birch, and various willows plus a sphagnum bog also occupy portions of P-RNA.

The surrounding forests were logged 50 years ago for white pine and redcedar poles. Near climax to climax western hemlock stands occur here. The unusual western redcedar-skunk cabbage habitat type common in this RNA is of interest.

The P-RNA is located in the Priest Lake District, Kaniksu National Forest, Bonner County, ID: 48° 37' N. lat., 117° 01' W. long. The area is mapped within the Gleason Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to the P-RNA: from the intersection of Hwy # 2 (ID # 200) with ID # 57 in the town of Priest River, travel north 53 km (33 miles) on Hwy # 57 to the Priest River Ranger Station. Continue north 3 km (2 miles) to FR # 308; proceed up Kalispell Ck for 3.7 km (2.3 miles) to intersection with FR # 1362. P-RNA is accessible from FRs # 308, # 1362 or # 657 on the western side.

PHYSICAL AND CLIMATIC CONDITIONS

The P-RNA terrain was shaped by glaciation and the action of a local glacial lake, followed by stream erosion. The site is composed of three benches, the slopes between and a lower slope from the lowest bench to the stream-cut valley bottom of Kalispell Creek.

The P-RNA experiences a strong maritime climate; the local mountains intercept the coastal storm tracks. Summer moisture is reduced, and winters are relatively mild; cold continental air sometimes invades the area. The nearest climatic station is at the Priest River Experimental Station 32 km (20 miles) southeast of P-RNA.

Mean Apr.-Oct. temperature is 11.9° C (53.4° F); November-March average -1.8° C (28.8° F). Annual precipitation averages 78 cm (31"), but summer months are relatively dry.

ECOLOGIC VALUES

The following forest habitat types are found on the P-RNA:

Tshe/Clun	ht	[69 ha/170 acres]
Thpl/Opho	ht	[3 ha/ 7 acres]
Thpl/Lyam	ht	[20 ha/ 50 acres]
Thpl/Eqar	ht	[1 ha/ 3 acres]

The forests fit into the following SAF Types:

215: W. white pine	[12 ha/ 30 acres]
224: W. hemlock	[57 ha/140 acres]
228: W. redcedar	[24 ha/ 60 acres]
Alder-birch	[8 ha/ 20 acres]
wetlands	[16 ha/ 40 acres]

Major shrub species in P-RNA are: Amelanchier alnifolia, Berberis repens, Betula glandulosa, Cornus stolonifera, Pachistima myrsinites, Lonicera utahensis, L. involucrata, Kalmia microphylla, Menziesia ferruginea, Holodiscus discolor, Oplopanax horridum, Phildelphus lewisii, Rubus parviflorus, Vaccinium membranaceum, V. occidentalis, and V. oxycoccus.

Representative groundlayer species: Actaea rubra, Arnica cordifolia, Anemone piperi, Asarum caudatum, Delphinium nuttallianum, Disporum hookeri, Gaultheria hispidula, Eriophorum gracile, Dryopteris cristata, Galium triflorum, Lysichitum americanum, Montia cordifolia, Tiarella unifoliata, Trientalis arctica, Pterospora andromeda, and Veronica americana.

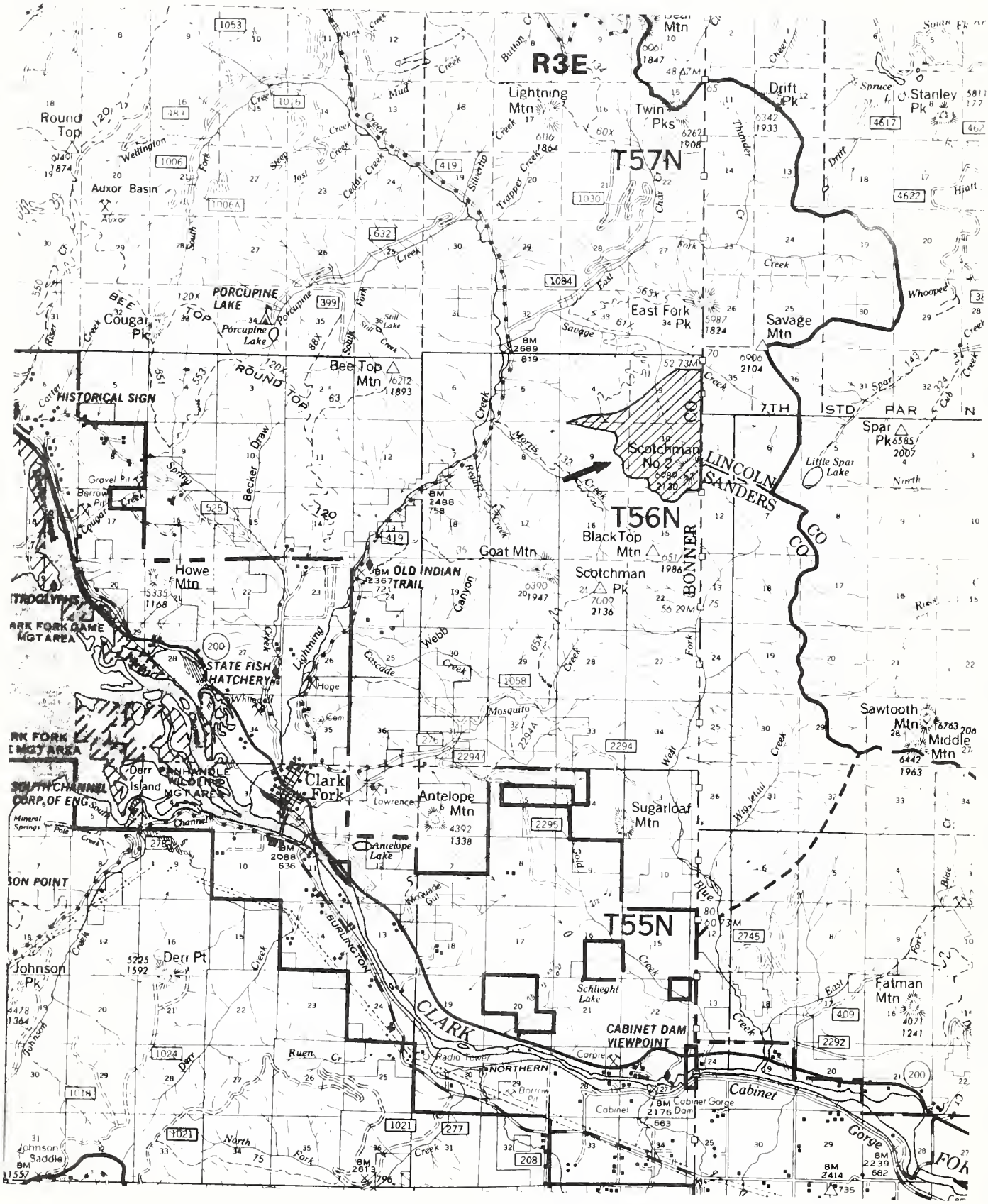
Representative mammals using the P-RNA include:

- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- Moose - Alces alces
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Beaver - Castor canadensis
- Muskrat - Ondata zibethica
- Wolverine - Gulo gulo

Birds utilizing the P-RNA include:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus

SCOTCHMAN NO. 2 PROPOSED RNA



7. SCOTCHMAN NO. 2 PROPOSED

RESEARCH NATURAL

AREA

Located in Idaho's panhandle, this RNA exhibits a very complex geology (folded, tilted, fractured Precambrian rocks) as well as subalpine and near-alpine conditions featuring subalpine fir, Engelmann spruce, whitebark pine, lodgepole pine, and other conifers. Alder-filled avalanche tracks are common. The area is grizzly bear habitat. A small cirque lake is also present.

****

The Scotchman No. 2 Research Natural Area (S-RNA) covers 514 ha (1270 acres) in the Cabinet Mountains of northern ID, bordering the stateline with MT. The highest point is on the summit of Scotchman No. 2, at 2130 m (6989'), and the lowest site is 1317 m (4320'). S-RNA represents the subalpine forest zone, and some sites are near-alpine in their biotic characteristics. The featured tree species is subalpine fir, which forms various mixtures with Engelmann spruce, lodgepole pine, and whitebark pine. Other species present include western larch, western white pine, and Douglas-fir. Sitka alder dominates in avalanche paths.

Soil and forest cover are reduced ("lacking") in S-RNA compared to other high-elevation RNAs in northern ID; much of the surface is rock. Both ephemeral and permanent streams are present, plus a small cirque pond.

The S-RNA is located on the Sandpoint District, Kaniksu National Forest, Bonner Co., ID: 48° 13' N. lat., 116° 04' W. long. The area is mapped within the Clark Fork Quadrangle, 15' series, and the Clark Fork NE Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to the S-RNA is from the town of Clark Fork (Hwy # 200); travel north on FR # 419 12.8 km (8 miles) and continue on FR # 1084 up East Fork Ck, for 1.9 km (1.2 miles); park at intersection with old Savage Ck Rd and walk up Savage Ck to trail that continues upslope to South Ridge which forms northern boundary of S-RNA. Much of the RNA is rugged and untrailed.

PHYSICAL AND CLIMATIC CONDITIONS

This part of northern ID was highly dissected by glaciation; steep slopes and cliffs surround a cirque basin. Precambrian Belt Supergroup metasediments have been folded and intensely faulted. Much of the S-RNA displays exposed bedrock.

The S-RNA experiences a Pacific maritime climate, with the mountains intercepting an abundance of moisture. Snowfall is heavy at upper elevations, although winters are relatively mild. Cold continental air sometimes invades. The nearest climatic station is at Cabinet Gorge, ID at 678 m (2225'). Summer temperatures average 18.5° C (66° F); winters average -3.0° C (26° F). Annual precipitation averages 84 cm (33"), but summer months average only 4 cm (1.5").

ECOLOGIC VALUES

The following forest habitat types are found on the S-RNA:

Abla/Mefe	ht	[113 ha/280 acres]
Abla/Xete	ht	[117 ha/290 acres]
Abla/Luhi	ht	[trace / trace]
Rockland		[283 ha/698 acres]

The forests fit into the following SAF Types:

206: Spruce-fir [182 ha/450 acres]
218: Lodgepole pine [49 ha/120 acres]

Major shrub species in S-RNA are: Alnus sinuata, Cassiope mertensiana, Kalmia microphylla, Menziesia ferruginea Pachistima myrsinites, Ribes lacustre, Sorbus scopulina, Juniperus communis, Phyllodoce empetriformis, Vaccinium scoparium, V. globulare, and V. caespitosum.

Representative groundlayer species: Arenaria capillaris, Arnica latifolia, A. mollis, Castilleja miniata, Epilobium angustifolium, Oxyria digyna, Pedicularis contorta, Pyrola secunda, Luzula hitchcockii, Carex geyerii, Silene menziesii, Calamagrostis purpurascens, Xerophyllum tenax, and Saxifraga bronchialis.

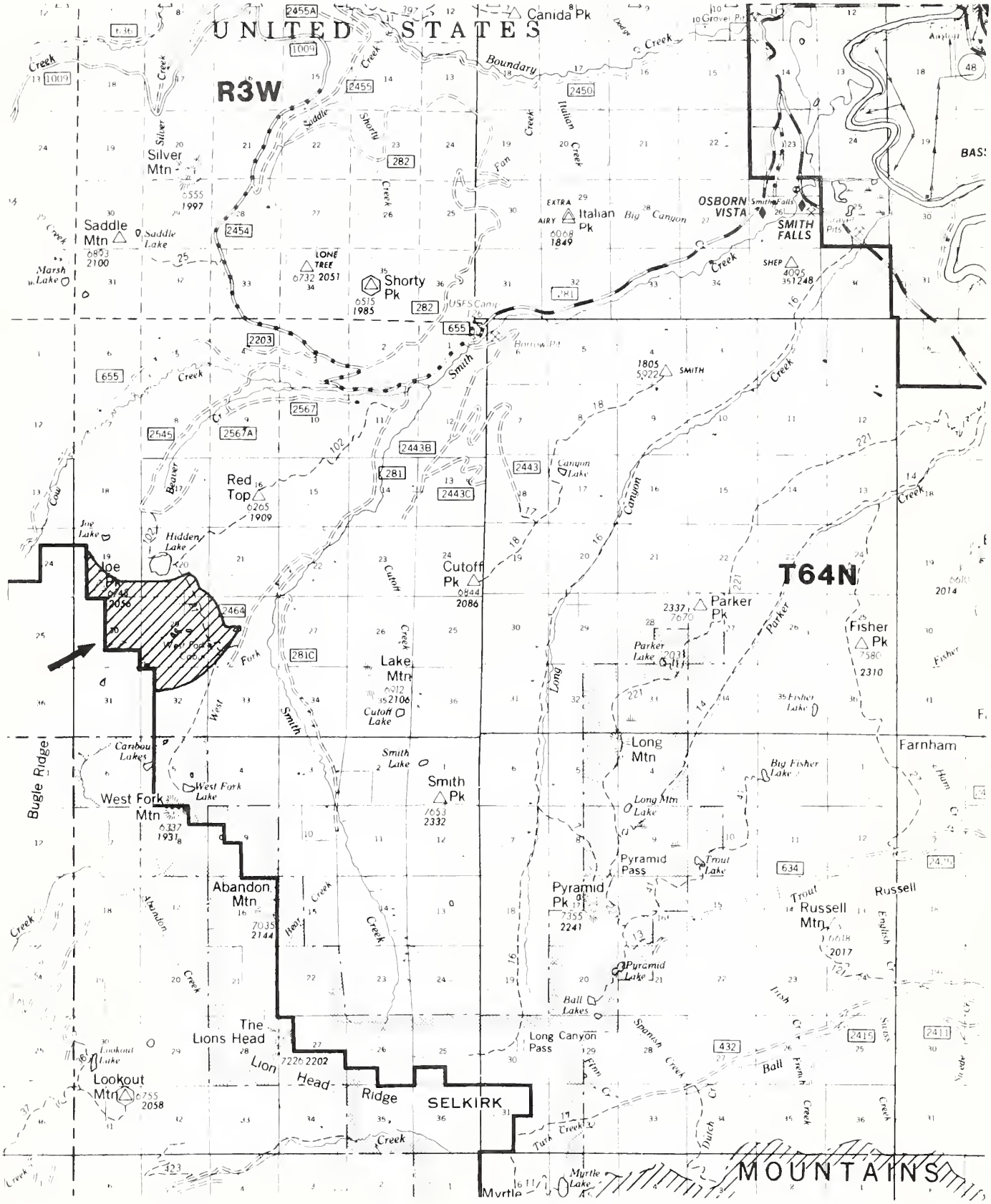
Representative mammals using the S-RNA include:

- Grizzly bear - Ursus arctos
- Elk - Cervus canadensis
- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- Moose - Alces alces
- Pika - Ochotona princeps
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Snowshoe hare - Lepus americanus
- Porcupine - Erethizon dorsatum

Birds utilizing the S-RNA:

- Common raven - Corvus corax
- Ruffed Grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus
- Swallow -Petrochelidon pyrrhonota

SMITH CREEK PROPOSED RNA



8. SMITH CREEK PROPOSED

RESEARCH NATURAL

AREA

This RNA, located within the Selkirk Mtns in northern ID, covers 513 ha (1267 acres) of poorly drained mountain terrain between 1440 and 2045 m (4750-6750'). Sphagnum bog communities are interspersed within forests dominated by subalpine fir and Engelmann spruce. The bogs feature leatherleaf saxifrage, while white rhododendron is abundant in adjacent forests.

****

The Smith Ck Research Natural Area (SC-RNA) features a variety of plant communities adapted to poorly drained conditions, including sphagnum bogs, sedge meadows, alder swales, open water ponds, and second order streams. Islands of Engelmann spruce are located among these wetland types. Subalpine fir, combines with Engelmann spruce, lodgepole pine, and whitebark pine to form the major forest cover above 1700 m (5610'). These same conifers are mixed with western redcedar, western hemlock, and western whitepine between 1400-1700 m (4620-5610').

SC-RNA is located on the Bonner's Ferry District of the Kaniksu National Forest, Boundary Co., ID: 48 52' N lat., 116 45' W. long. SC-RNA is mapped within the Shorty Peak, Smith Peak, Grass Mountain and Caribou Creek 7.5' USGS Quadrangle.

ACCESS AND ACCOMMODATIONS

SC-RNA may be reached by travelling north from Bonners Ferry, ID to Copeland, ID via Hwy # 95; westward from Copeland on Co. Hwy to FR # 417; go north on FR # 417 to vicinity of Smith Falls, where intersection is made with Smith Ck FR # 281. Travel west to intersection of West Fork Smith Ck FR # 2446; proceed on FR # 2446 to its end point; take forest Trail # 21 which enters east end of SC-RNA and passes by West Fork Cabin.

PHYSICAL AND CLIMATIC CONDITIONS

SC-RNA is positioned in the Selkirk Mountains, occupying a portion of the Kaniksu Batholith; the central part is flat and poorly drained, and this in turn is surrounded by rock cliffs and talus slopes. Glacio-fluvial deposits are also present. In the NW corner of the SC-RNA is Joe Peak, a 2044 m (6745') mountain, upon whose slopes avalanche tracks descend. Mountain glaciation scoured out cirques and steep headwalls. The SC-RNA is located within maritime storm tracks that bring an abundance of moisture to this part of ID; approximately 160-200 cm (65-80") of annual precipitation is received in the SC-RNA, about 75% of this in the form of snow..

The SC-RNA was effected by the 1967 Trapper Peak fire which burned over the top of Joe Peak and down a short distance on its east flank. Little revegetation has taken place on these burned sites.

ECOLOGIC VALUES

The SC-RNA supports the following habitat types:

Abla/Pamy	ht	[102 ha/251 acres]
Abla/Mefe	ht	[205 ha/508 acres]
Abla/Xete	ht	[159 ha/392 acres]
Abla/Luhi	ht	[47 ha/117 acres]

All forests belong to SAF Cover Type # 206 = Englemann spruce & subalpine fir. Bogs and ponds occupy 18 ha (42 acres). Barren rock & talus = 17 ha (41 acres).

Major shrub species present are: Amelanchier alnifolia, Acer glabrum, Alnus sinuata, Betula glandulosa, Cassiope mertensiana, Kalmia microphylla, Lonicera involucrata, Menziesia ferruginea, Sorbus scopulina, Rhododendron albiflorum, Pachistima myrsinites, Vaccinium caespitosum, V. globulare, V. membranaceum, and V. scoparium.

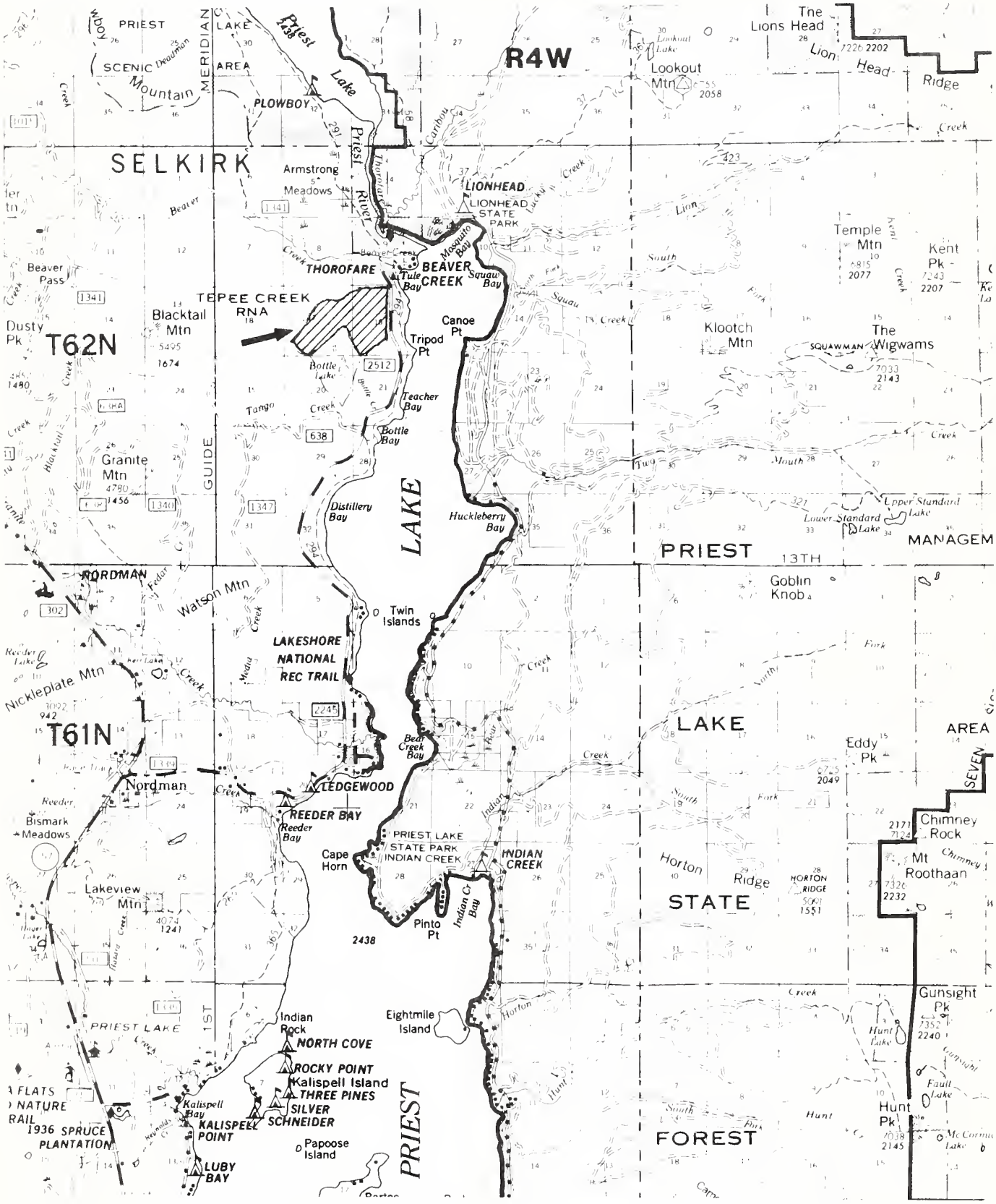
Herbaceous species include: Carex nigricans, Clintonia uniflora, Epilobium alpinum, E. angustifolium, Eriophorum polystachion, Erythyronium grandiflorum, Gymnocarpium dryopteris, Leptarrhena pyrolifolia, Luzula hitchcockii, Lycopodium annotinum, Ranunulus escholzii, Veratrum viride, and Xerophyllum tenax.

The Smith Ck Planning Report lists a variety of vertebrates that may exist in the SC-RNA. Woodland caribou (Rangifer caribou) are known to have used the area in times past and may continue to make winter use of the SC-RNA.

Mammals:
Black bear - Ursus americanus
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Mountain lion - Felis concolor
Wolverine - Gulo gulo
Mtn goat - Oreamnos americanus)
Moose - Alces alces
Pygmy shrew - Microsorex hoyi
Water vole - Microtus reichardsoni
N. bog lemming - Synaptomys borealis

Birds include:
Ptarmigan - Lagopus leucurus
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Boreal chickadee - Parus hudsonicus
Common raven - Corvus corax
Golden eagle - Aquila chryaetos

TEPEE CREEK RNA



9. TEPEE CREEK

RESEARCH NATURAL AREA

Tepee Ck RNA was established in 1935 to set aside examples of seral and mature western white pine forests in northern ID. It is contiguous with Bottle Lake RNA, located at the northern end of Priest Lake. Western redcedar and western hemlock are the climax species for the area.

****

The Tepee Ck Research Natural Area (TC-RNA) occupies a total of 302 ha (746 acres) in northern ID. Its most important value is the western white pine forest types that cover most of the area. Based on timber cruise data taken in 1913 TC-RNA had 49 ha (121 acres) of whitepine reproduction, 20-40 years old, with scattered veterans; 74 ha (184 acres) of mixed pole-sized, 40-60 years, with older pines in overstory; and 178 ha (441 acres) of mature (300+ years) white pine, redcedar, and western hemlock.

The white pine component resulted from past fires that swept through this part of northern ID. The older stands escaped the most recent burns. Blister rust, mountain pine beetle and windthrow have taken a heavy toll of the white pine. Other conifers occurring in TC-RNA include grand fir, Douglas-fir, and western larch.

The highest elevation within TC-RNA is at the head of Tepee Ck, 970 m (3200'), and the lowest on the shore of Priest Lake, 742 m (2450').

TC-RNA is located on the Priest Lake District, Kaniksu National Forest, Bonner Co., ID: 48° 43' N. lat., 116° 53' W. long. The area is mapped on the Priest Lake NW and Priest Lake NE Quadrangles, 7.5' series (see Bottle Lake RNA description).

ACCESS AND ACCOMMODATIONS

The TC-RNA may be reached from Nordman, ID, (Hwy # 57) 58 km (36 miles) north of Priest River, ID; eastward to Rudia Bay on Priest Lake, and then north on the West Shore Road to Tepee Ck (Campground) at Tule Bay. The Tepee Ck drainage may be followed directly into the central part of TC-RNA. It may also be reached by following the same directions given for Bottle Lake RNA located just to the south of Tepee Ck RNA.

PHYSICAL AND CLIMATIC CONDITIONS

The Tepee Ck drainage occupies a relatively flat valley draining to the east, with a few short tributary gulches; the low parts are surrounded by rounded ridges. Slopes are moderate to steep, ranging from 10-45%. The soil is mostly a deep sandy loam, overlying the ID Batholith.

Granitic rocks are prominent in the area, but all of the area was subject to glacial action and a veneer of windblown soil mantles TC-RNA. The soils ranges from shallow and rocky, to deep and productive. This RNA is within the inland maritime climatic zone; the climate is cool and moist: the July average: 17.9° C (64.3° F); Jan. average: -4.8° C (23.4° F); average annual: 6.6° C (43.8° F). Annual precipitation: 85 cm (33.5").

ECOLOGIC VALUES

The following forest habitat type is found in the TC-RNA:

Tshe/Clun ht [302 ha/746 acres]

The SAF Forest Cover Types:

215: W. white pine [123 ha/305 acres]
227: Cedar-hemlock [178 ha/441 acres]

Common shrub species are believed to include:

Acer glabrum, Alnus incana, Berberis repens, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus scopulina, Holodiscus discolor, Rosa gymnocarpa, Philadelphus lewisii, Vaccinium membranaceum, V. ovalifolium, Physocarpus malvaceusd Sambucus racemosa.

Common herbaceous species include:

Athyrium filix-femina, Adenocaulon bicolor, Botrychium virginianum, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Erythronium grandiflorum, Oplopanax horridum, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Monotropa uniflora, Mitella stauropetala, Aralia nudicaulis, Pyrola asarifolia, Asarum caudatum, Actaea rubra, and Xerophyllum tenax.

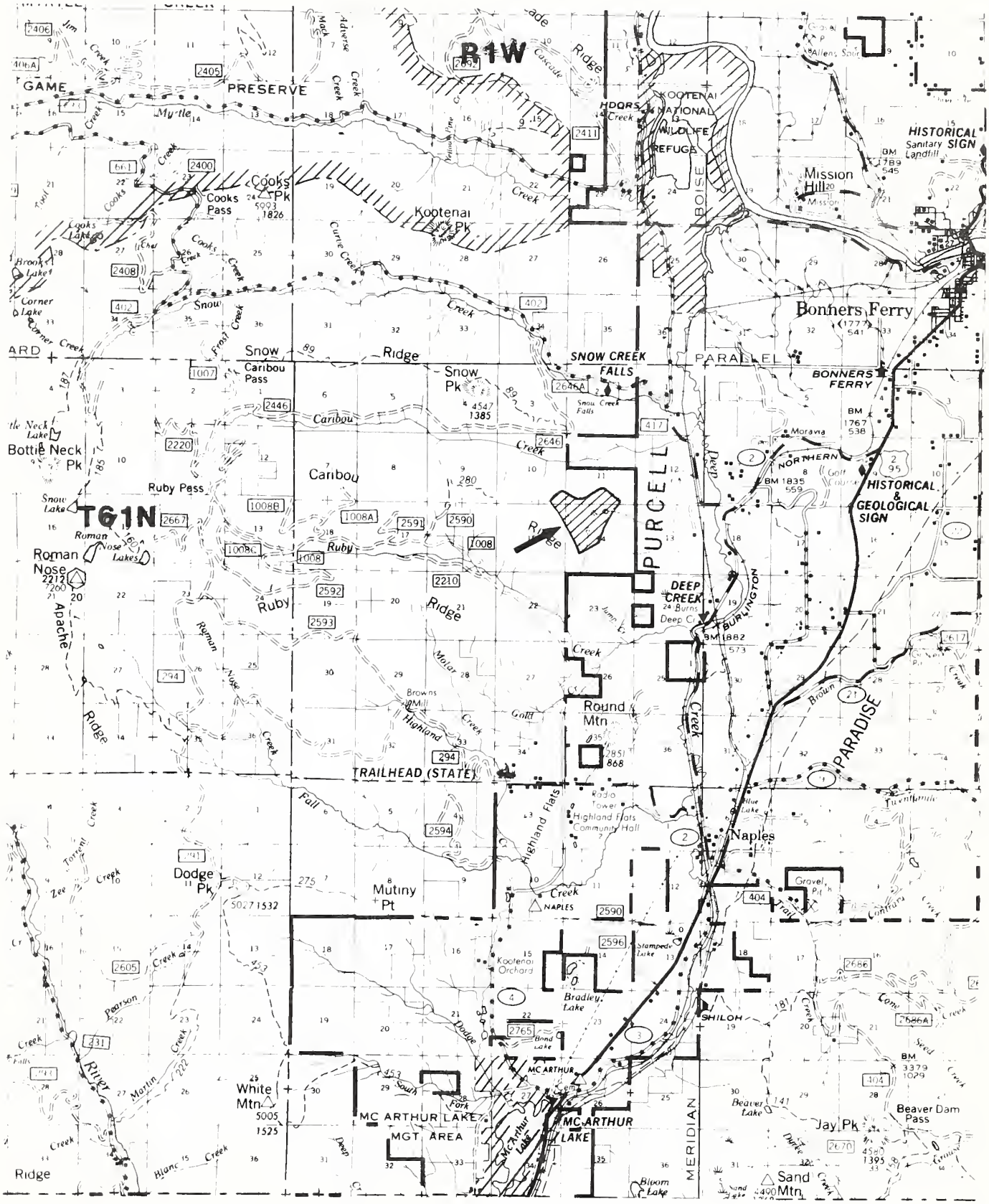
Forty-five mammals are listed for Bottle Lake RNA; these are assumed to also occur in TC-RNA:

Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Avifauna include:

Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

THREE PONDS PROPOSED RNA



10. THREE PONDS PROPOSED RESEARCH NATURAL AREA

This RNA consists of a small, mid-elevation, strongly glaciated basin at the edge of the Purcell Trench near Bonners Ferry, ID. These are small lakes or ponds that are undisturbed, they are shallow and do not have fish populations.

****

The Three Ponds Research Natural Area (TP-RNA) covers 97 ha (240 acres). This site represents a good example of a small heavily-glaciated basin, a complex of bare rock ridges and draws, and pockets of soil that are highly productive. The site variation results in a diversity of vegetation. The three ponds (West Pond, Middle Pond and East Pond) are each shallow and cover 1-3 ha (3-5 acres), without fish. Pond water levels are controlled by beaver activity.

About a third of TP-RNA is mature forest which dates back to 1850; the remaining two-thirds is a mixture of older trees and young stands that originated after a 1929 fire. Conifer dominants are: Douglas-fir, grand fir, western hemlock, and western redcedar. One plant species of interest, Lewisia columbiana var. columbiana, occurs in TP-RNA. An excellent stand of western paper birch is also present.

The TP-RNA is located on the Bonners Ferry District, Kaniksu National Forest, Boundary Co. ID: 48° 39' N. lat., 116° 26' W. long. The area is mapped within the Moravia Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

TP-RNA is 7.2 air km (4.5 air miles) from the Bonners Ferry District Office located on Hwy # 95. Travelling south on # 95, turn west on Co. Hwy # 2; follow south and west for 4.2 km (2.6 miles), and turn onto FR # 417 and continue for 0.8 km (0.5 mile) crossing Deep Ck. Follow # 417 northward 1.8 km (1.1 miles) to Caribou Ck Road; follow this latter road 0.5 km (0.3 miles) and park. Climb steep slope to ridge for 1.8 km (1.1 miles) to TP-RNA boundary. Only game trails exist. Time between car and pond area is 2.5 hours.

PHYSICAL AND CLIMATIC CONDITIONS

Three Ponds RNA is located on a glaciated bench along the east slope of the Selkirk Mountains. Elevations range from 1018 m (3340') in the RNA's southwest corner to 1190 m (3905') on the northern boundary ridge. A small basin on the bench contains three ponds surrounded by slopes that have been highly scoured; bedrock is exposed in many places. A sharp, deep valley near the western boundary marks a fault line.

Northern ID is under the influence of Pacific maritime air; winters are more mild than expected, being humid and cloudy. Snowfall is heavy in the mountains. Some colder continental air sometimes spills into the area. There are no nearby climate stations; Bonners Ferry records are as follows: mean annual temperature is 7.7° C (45.9° F); midsummer averages 19° C (66° F), winters -4.2° C (24.4° F). Annual precipitation is 58 cm (23"); midsummer months are dry, averaging 2.5 cm (1").

ECOLOGIC VALUES

The following forest habitat types are found on the TP-RNA:

Psme/Phma	ht	[24 ha/ 60 acres]
Psme/Vagl	ht	[1 ha/ 3 acres]
Abgr/Clun	ht	[24 ha/ 60 acres]
Tshe/Clun	ht	[16 ha/ 40 acres]
Tshe/Asca	ht	[6 ha/ 14 acres]
Ponds		[4 ha/ 10 acres]
Rockland		[21 ha/ 50 acres]

The forests fit into the following SAF Types:

210: Douglas-fir	[21 ha/ 52 acres]
213: Grand fir	[24 ha/ 60 acres]
218: Lodgepole pine	[26 ha/ 65 acres]
W. paper birch	[1 ha/ 3 acres;

Major shrub species in TP-RNA are: Alnus incana, Berberis repens, Amelanchier alnifolia, Holodiscus discolor, Ribes lacustre, Spiraea densiflora, Physocarpus malvaceus, Pachistima myrsinites, Symphoricarpos albus, and Vaccinium globulare.

Representative groundlayer species: Achillea millefolium, Arnica cordifolia, Adenocaulon bicolor, Aralia nudicaulis, Athyrium filix-femina, Asarum caudatum, Clintonia uniflora, Galium triflorum, Gymnocarpium dryopteris, Carex spp., Pyrola secunda, Orbanche uniflora, Xerophyllum tenax, and Veratrum viride.

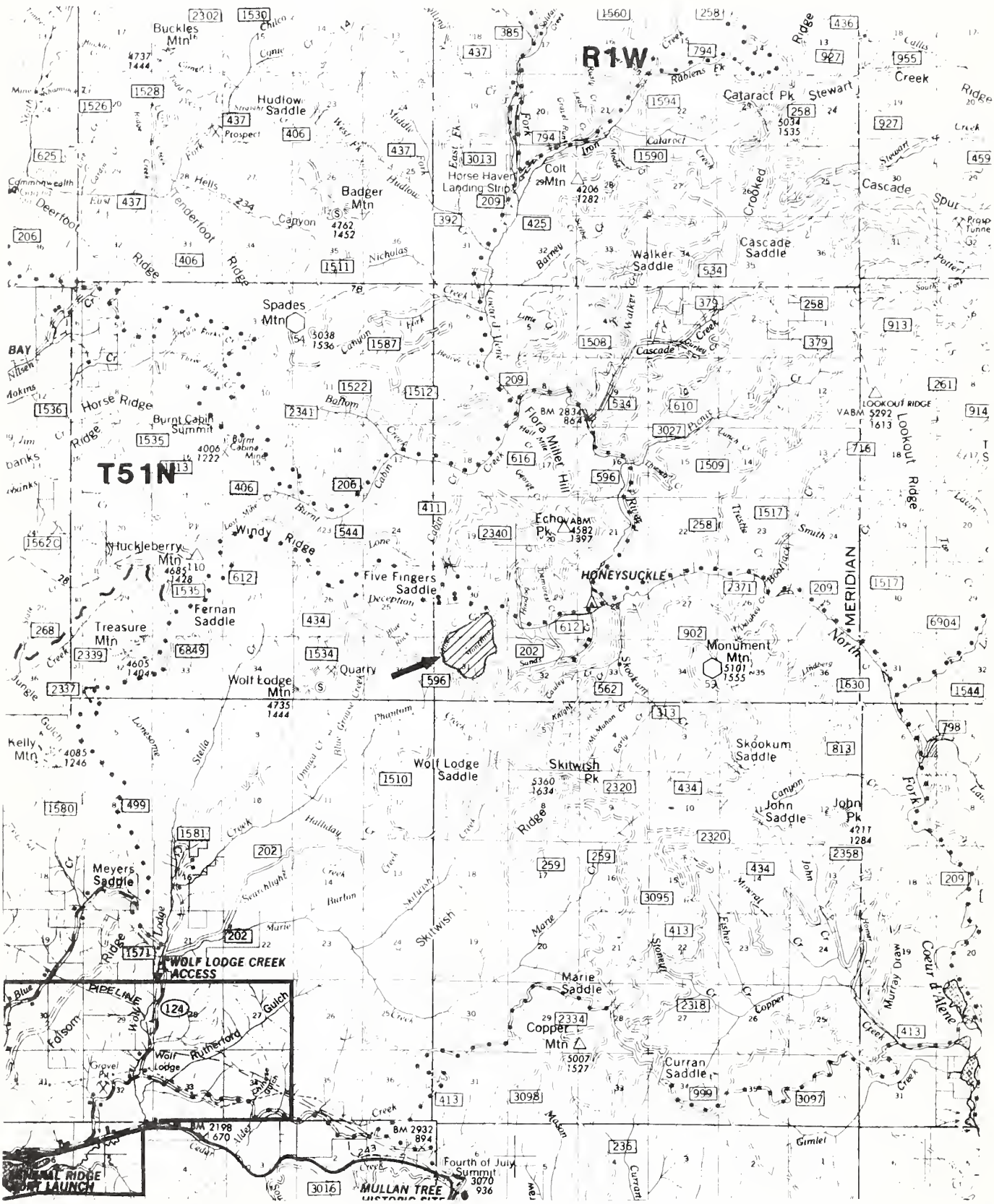
Representative mammals using the TP-RNA include:

- Elk - Cervus canadensis
- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- Moose - Alces alces
- Porcupine - Erethizon dorsatum
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Snowshoe hare - Lepus americanus
- Beaver - Castor canadensis

Birds utilizing the TP-RNA include:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Killdeer - Charadrius vociferous
- Blue grouse - Dendragapus obscurus

MONTFORD CREEK RNA



11. MONTFORD CREEK

RESEARCH NATURAL AREA

Located within the Deception Ck Experimental Forest in northern ID, east of Coeur d'Alene. Its primary feature is undisturbed old growth western white pine, in the western hemlock habitat type. Montford Ck is a spring-fed, free-flowing stream, valuable in itself.

****

The Montford Ck Research Natural Area (MC-RNA) occupies a total of 118 ha (292 acres) within the Deception Ck Experimental Forest. It has operated as a natural area since 1934. MC-RNA comprises a small but complete drainage which supports undisturbed old growth stands of either pure or mixed assemblages of western hemlock, grand fir, western white pine, western larch, and Douglas-fir. Some Engelmann spruce and subalpine fir are also present in small amounts.

In recent decades the white pine has been seriously affected by mountain pine beetle and white pine blister rust; little of the original white pine cover type remains intact. Grand fir and hemlock are present-day cover dominants.

MC-RNA is located on the Fernan District, Coeur d'Alene National Forest, Kootenai Co., ID: 47° 43' N. lat., 116° 31' W. long. MC-RNA is mapped within the USGS Wolflodge Quadrangle, 7.5' series. It is also documented on Deception Ck Experimental Forest maps.

ACCESS AND ACCOMMODATIONS

The MC-RNA may be reached from Coeur a'Alene by travelling east 32 km (20 miles) on the Fernan Ck Rd # 268, to FR # 612 which follows along Deception Ck opposite the northern tip of MC-RNA. A bridge crossing allows ready access. The Wolflodge Rd connects U.S. Hwy # 90 (Wolf Lodge Bay interchange) to the south boundary of MC-RNA. A trail up Montford Ck provides access to the interior of the natural area.

PHYSICAL AND CLIMATIC CONDITIONS

Montford Ck RNA's highest point is on its SW corner at 1341 m (4400'), and its lowest point is along Deception Ck, 930 m (3050'). Almost all of the Montford Ck drainage is included; there are ridges and V-shaped stream valleys. Soils are derived from metasedimentary rocks of the Belt Supergroup, with surface additions of loess and ash.

MC-RNA has an inland maritime climate. Summers are sunny and dry; July-Aug. are peak fire-danger months. Winters are cloudy and moist, and have deep snow. Experimental Station, [2.4 km (1.5 miles) away] climatic data: Jan. temperature averages -5.3° C (22° F); mean July temperature is 17.1° C (63° F). Average annual precipitation is 132 cm (52").

ECOLOGIC VALUES

The following forest habitat types are found in the MC-RNA:

Tshe/Clun	ht	[41 ha/102 acres]
Tshe/Opho	ht	[16 ha/ 40 acres]
Tshe/Atfi	ht	[" ha/ " acres]
Tshe/Gydr	ht	[24 ha/ 60 acres]
Tshe/Asca	ht	[37 ha/ 90 acres]

The SAF Forest Cover Types:

215: W. white Pine	[20 ha/ 50 acres]
224: W. hemlock	[53 ha/130 acres]
210: Douglas-fir	[3 ha/ 7 acres]
213: Grand fir	[40 ha/100 acres]
212: Western larch	[2 ha/ 5 acres]

Shrubs believed common in MC-RNA:
Acer glabrum, Berberis repens, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus spp., Holodiscus discolor, Rosa spp., Philadelphus lewisii, Vaccinium membranaceum, Sambucus spp., and Oplopanax horridum. Rubus pedatus is included in this RNA's flora.

Common herbs are believed to include:
Athyrium filix-femina, Adenocaulon bicolor, Asarum caudatum, Botrychium virginianum, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Gymnocarpium dryopteris, Mitella stauropetala, Aralia nudicaulis, Actaea rubra, and Xerophyllum tenax.

Diseases occurring include:
Cronartium ribicola, Arceuthobium campylododum, Hypodermella laricis, Fomes pini, Echinodontium tinctorium, and Armillaria mellea.

MC-RNA's old-growth does not support an abundance of vertebrates:
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Beaver - Castor canadensis
Black bear - Ursus americanus
Mountain lion - Felis concolor
Coyote - Canis latrans

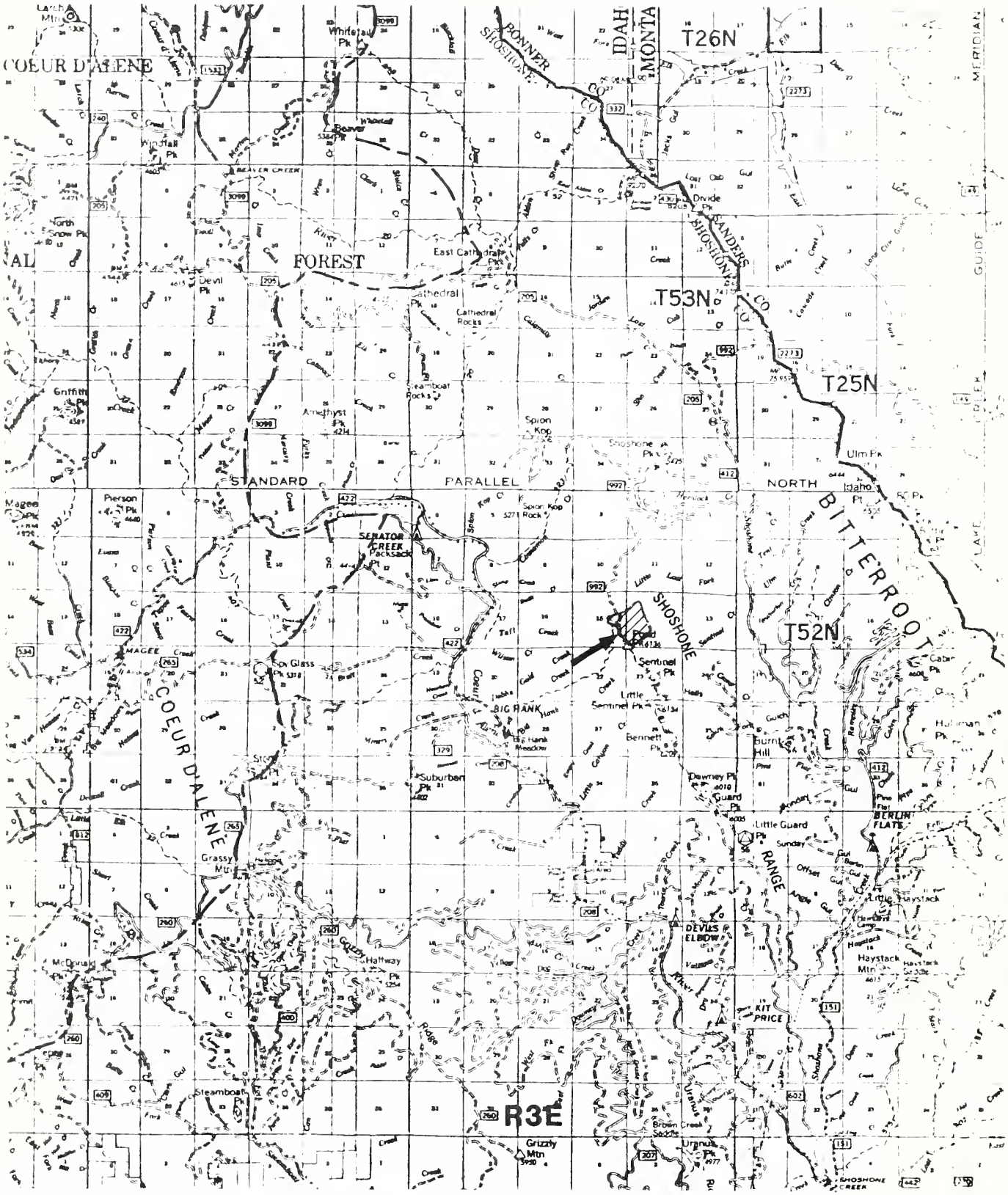
Avifauna is likely to include:

Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

Small cold springs and Montford Ck support a variety of invertebrates:

Caddis flies, Mayflies, True flies, and Stoneflies

POND PEAK PROPOSED RNA



12. POND PEAK PROPOSED

RESEARCH NATURAL

AREA

This RNA encompasses an upper elevation watershed basin in northern ID, supporting conifer forests dominated by mountain hemlock and lodgepole pine. The hemlock stands are old growth; some display diameters up to 1 m (3') dbh. A spring-fed pond is centered in this RNA. Talus rock slopes are also present.

****

The Pond Peak Research Natural Area (PP-RNA) occupies 109 ha (2708 acres) of mountain terrain in north ID's panhandle. P-RNA is in the heart of a large area of Precambrian sedimentary rock of the Belt Supergroup. Pleistocene glaciation came close but did not cover the area; local mountain glaciers, however, did cover Pond Peak. Old growth stands of near-pure mountain hemlock are featured with diameters up to 1 m dbh, and heights of 40 m (130'). PP-RNA is near mountain hemlock's northern range limits in Idaho. Stands of mixed sapling to pole-sized mountain hemlock, lodgepole pine, subalpine fir, western larch and western white pine resulting from a 1931 fire are also present in PP-RNA.

A small pond without an outlet and fed by springs and snowmelt water, is present on the site. It is fringed by Sitka alder and various species of sedge. The PP-RNA is located on the Wallace Ranger District, Coeur d'Alene National Forest, Shoshone Co., ID: 47° 41' N. lat., 116° 03' W. long. The area is mapped within the Pond Peak Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The PP-RNA may be reached during the snow-free months via the Kingston Exit of Interstate 90 in ID. FR # 9 is followed up the Coeur d'Alene River for 37 km (23 miles) to Prichard, ID. Then follow FR # 208 along the River 10 km (6 miles) to Shoshone Camp. From this latter point take FR # 151 and then FR # 412 up Shoshone Ck for 29 km (18 miles) to the Shoshone Ck-Jordan Ck Divide; then FR # 992 for 11 km (7 miles) to Pond Peak (2483 m/6136').

PHYSICAL AND CLIMATIC CONDITIONS

PP-RNA encompasses a small, glaciated basin on the east slope of the Shoshone Range in the Coeur d'Alene Mountains. The area is underlain by Precambrian Belt Supergroup metasediments that have been folded and intensely faulted. Ripple marks are common on the fractured surfaces.

The climate of Pond Peak is influenced primarily by moist Pacific maritime air. The winters are mild, but snowfall is very heavy. Summers have less cloud cover and moisture is less, but never in short supply. Mountain hemlock does not tolerate water stress. Climate data do not exist for the PP-RNA area although it is believed that the site receives an annual precipitation total of about 200 cm (80"), and even midsummer temperatures average below 15° C (60° F).

ECOLOGIC VALUES

The following forest habitat types are found in the PP-RNA:

Tsme/Mefe & Luhi	ht	[41 ha/102 acres]
Tsme/Xete	ht	[51 ha/125 acres]
Rockland types		[16 ha/ 40 acres]
Pond		[1 ha/ 3 acres]

The SAF Forest Cover Types:
205 Mountain hemlock [64 ha/157 acres]
218 Lodgepole pine [28 ha/ 70 acres]

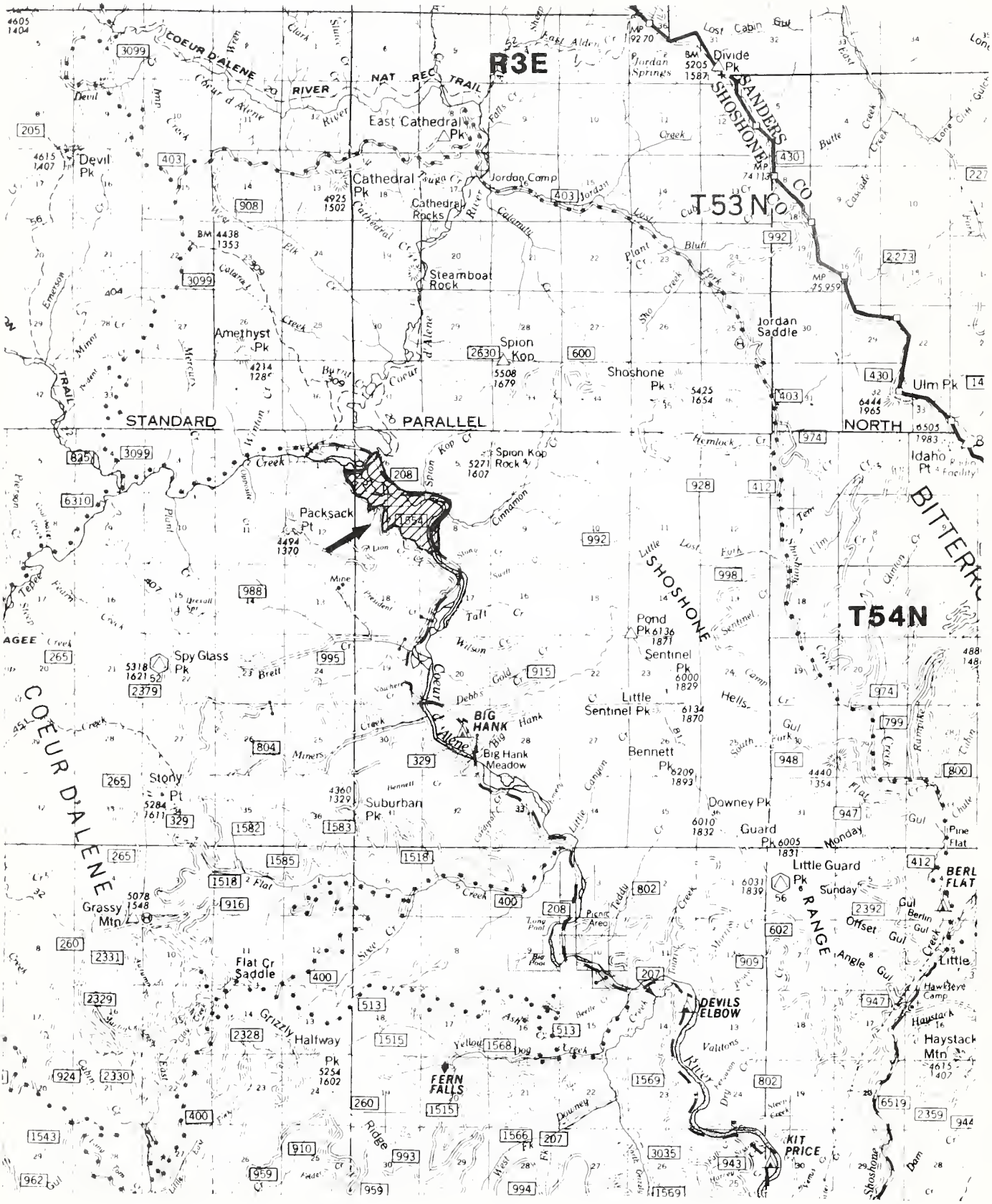
The major shrub species are:
Alnus sinuata, Menziesia ferruginea, Pachistima myrsinites, Ribes lacustre, Salix scouleriana, Sorbus scopulina, Sambucus racemosa, Spiraea betulifolia, Vaccinium globulare, and V. scoparium.

Common herbaceous species include:
Achillea millefolium, Actaea rubra, Athyrium filix-femina, Arnica latifolia, Calamagrostis canadensis, Carex rossii, Epilobium alpinum, Galium triflorum, Hieracium albiflorum, Luzula hitchcockii, Mimulus moschatus, Pyrola secunda, Polemonium pulcherrimum, Silene scouleri, and Xerophyllum tenax.

Mammals using the PP-RNA include:
Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus
Pika - Ochotona princeps
Bushytail woodrat - Neotoma cinerea

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canach^ites canadensis
Blue grouse - Dendragapus obscurus
C. nutcracker - Nucifraga columbiana

SPION KOP PROPOSED RNA



13. SPION KOP PROPOSED

RESEARCH NATURAL

AREA

Situated along the Coeur d'Alene River in northern Idaho, this RNA features northern black cottonwood communities, a system of changeable, flood-induced channels, and a mixture of conifer species: moist-site hemlock, and others established after a severe 1931 fire.

****

The Spion Kop Research Natural Area (SK-RNA) occupies a total of 188 ha (465 acres) along a segment of the Coeur d'Alene River in Idaho's panhandle. Northern black cottonwood along with a variety of tall shrubs usually associated with bottomland cottonwood, is the major cover type in SK-RNA. The moist portions escaped a severe 1931 fire, and now support old-growth cottonwood (up to 154 cm/60" dbh). In addition, this RNA includes a section of a river with a variety of channels and slough. Small marshes and beaver ponds exist. Well-drained dry sites are also included in this riparian complex.

Slopes adjacent to the river bottom support 40-50 year old mixed species stands, arising after a 1931 fire. Much of the burn site was planted to western white pine and ponderosa pine. White pine blister rust has killed many white pines. Other conifers present are grand fir, western hemlock, western redcedar, subalpine fir and Engelmann spruce.

SK-RNA is located on the Wallace District, Coeur d'Alene National Forest, Shoshone Co., ID: 47° 52' N. lat., 116° 07' W. long. SK-RNA is mapped on the corners of four 7.5' Quadrangles: Cathedral Peak, Jordan Creek, Spyglass, and Pond Peak.

ACCESS AND ACCOMMODATIONS

The SK-RNA may be reached by leaving US Interstate 90 at the Kingston (ID) Exit, and follow FR # 9 up the Coeur d'Alene River to Prichard, and then FR # 208 directly to SK-RNA. From I-90 the distance is 74 km (46 miles), on oiled road. There is a nearby campground at Senator Ck.

PHYSICAL AND CLIMATIC CONDITIONS

Spion Kop RNA encompasses the relatively broad floodplain of the Coeur d'Alene River. Adjacent slopes rise abruptly from the valley bottom. The elevation shifts from 840 m (2755') to 1064 m (3490'). The river meanders through the RNA and isolated oxbows and old channels occupy much of the bottomland terrain.

SK-RNA has a moist, inland maritime climate but summers are sunny and dry; winters are cloudy and moist, surrounding mountains receive heavy snowfall. Some continental climate influence is also present. Deception Creek HQ, ID, 30.5 km (19 miles) SW of SK-RNA best expresses the RNA's climate: Apr.-Sept. temperature averages 11.9° C (53.4° F), with July mean of 16.6° C (61.9° F). Jan. temperature averages -5.2° C (22.7° F). Mean annual precipitation is 1428 cm (56"), with July-Aug. rainfall 2-3 cm (1-1.5") each month.

ECOLOGIC VALUES

The following habitat and community types are found in the SK-RNA:

Abgr/Clun	ht]	[ ]
Tshe/Clun	ht]-----	[81 ha/200 acres]
Tshe/Asca	ht]	[ ]
Cottonwood	ct	[35 ha/ 85 acres]
Canarygrass	ct	[6 ha/ 15 acres]
River Terrace	ct	[32 ha/ 80 acres]
Rock cliffs		[24 ha/ 60 acres]
River & sloughs		[10 ha/ 25 acres]

The SAF Forest Cover Types:

213: Grand fir	[24 ha/ 60 acres]
215: W. white pine	[32 ha/ 80 acres]
222: Blk cottonwood	[35 ha/ 80 acres]
224: W. hemlock	[24 ha/ 60 acres]

Representative shrub species include: Acer glabrum, Alnus incana, Berberis repens, Linnaea borealis, Cornus stolonifera, Pachistima myrsinites, Rubus parviflorus, Holodiscus discolor, Pachistima myrsinites, Vaccinium globulare, Menziesia ferruginea, Symphoricarpos albus, and Crataegus douglasii.

Common herbaceous species include: Adenocaulon bicolor, Actaea rubra, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Galium triflorum, Athyrium filix-femina, Pteridium aquilinum, Asarum caudatum, Veratrum californicum, Pseudoroegneria spicata, Calamagrostis rubescens, Carex geyeri, and Festuca idahoensis.

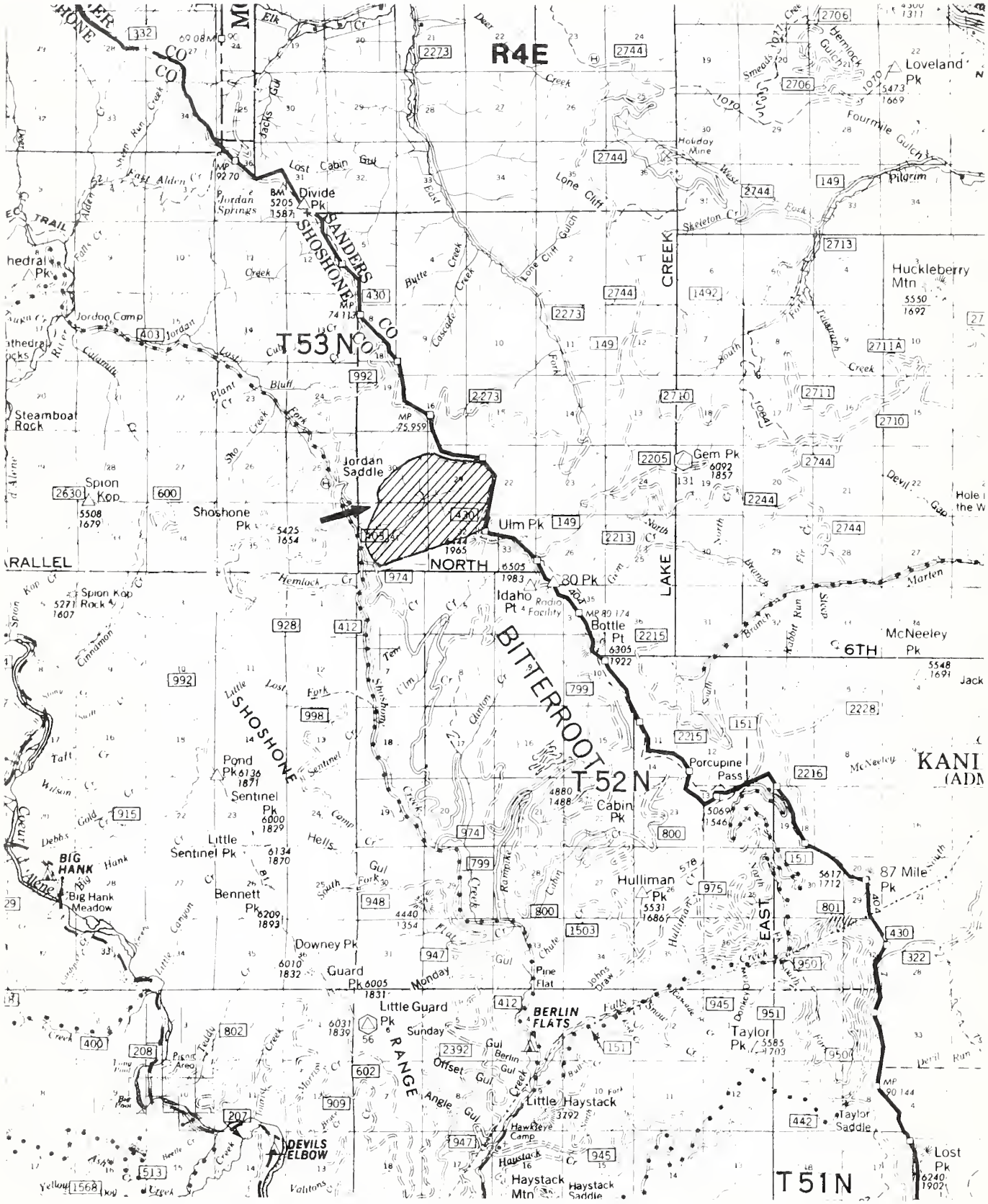
Mammals believed to occupy the SK-RNA area include:

- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- Beaver - Castor canadensis
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Coyote - Canis latrans
- Elk - Cervus canadensis
- Marten - Martes americana

Avifauna include:

- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus
- Osprey - Pandion haliaetus
- Common raven - Corvus corax

UPPER SHOSHONE CREEK PROPOSED RNA



14. UPPER SHOSHONE CREEK PROPOSED

RESEARCH NATURAL

AREA

This RNA encompasses an entire small (534 ha/1320 acres) drainage system in northern ID, with western hemlock at 1090 m (3600') and mountain hemlock-subalpine fir at 1950 m (6400'). A steep gradient stream system is present with a waterfalls and cold springs.

****

The Upper Shoshone Ck Research Natural Area (USC-RNA) supports a wide assortment of conifer forests distributed along a steep elevation gradient. Early fires (1910, 1931) in this part of Idaho created numerous seral forests and brushfields. The lower drainage is dominated by western hemlock, western white pine, and grand fir. There are extensive areas of overmature western hemlock with understories of western yew. The upper reaches are dominated by mountain hemlock and subalpine fir. Seral forests are dominated by Douglas-fir, western larch, and lodgepole pine. The creek is permanent, second order, 2.4 km (1.5 miles) long, and is of the "riffle" type throughout. The bedrock waterfalls is 2 m (6') high.

The USC-RNA is located in the Wallace District, Coeur d'Alene National forest, Shoshone Co., ID: 47° 55' N. lat., 116° 00' W. long. It is mapped within the USGS Gem Peak and Jordan Ck Quadrangles, 7.5' series. It is adjacent to the Ulm Peak RNA, Montana.

ACCESS AND ACCOMMODATIONS

USC-RNA, located on the MT/IDA stateline may be reached from either east or west. From Wallace, ID, FR # 456 is taken north to FR # 208 and by FR # 208 to FR # 151 at Shoshone Ck. Take FR # 151 to FR # 412 at Berlin Flats; FR # 412 provides access to the lower part of USC-RNA, and if followed further, FR # 412 will take visitors to FR # 992 which leads to FR # 430 which forms the upper boundary of USC-RNA. From the MT side, the Pilgram Ck Rd # 149 goes to the Gem Peak Lookout Rd # 2205 which leads to the stateline. No campgrounds exist near this RNA.

PHYSICAL AND CLIMATIC CONDITIONS

USC-RNA is located on the upper west slope of the northern Bitterroot Mtns (= "Coeur d'Alene Mtns"); the drainages have narrow, canyon-like appearances. Moist maritime air delivers high annual precipitation to the general area: from 125-150 cm (50-60"), with over 500 cm (200") snowfall recorded at the nearest townsites, and thus higher than this at USC-RNA. Summers have reduced moisture and temperatures are moderate, typical of the maritime influence.

The USC-RNA is underlain by Precambrian Belt metasediments, folded and intensely faulted. Rocks include maroon siltite, quartzite, and various colored argillites. Ripple marks and mud cracks are common. Local mountain glaciation effects the upper parts of USC-RNA. Soils originate from parent rocks, loess, and volcanic ash.

ECOLOGIC VALUES

The USC-RNA supports the following forest habitat types (acreage of each being revised):

Abgr/Clun	ht
Tshe/Opho & Tshe/Atfi	hts
Tshe/Gydr & Tshe/Clun	hts
Tshe/Asca	ht
Tsme/Xete & Tsme/Mefe	hts
Abla/Xete	ht

SAF forest types are as follows:

205: Mtn. hemlock	[112 ha/276 acres]
206: Spruce-fir	[55 ha/137 acres]
208: Whitebark pine	[10 ha/ 25 acres]
210: Douglas-fir	[6 ha/ 15 acres]
213: Grand fir	[39 ha/ 97 acres]
215: W. white pine	[4 ha/ 10 acres]
224: W. hemlock	[47 ha/115 acres]

Major shrub species are:

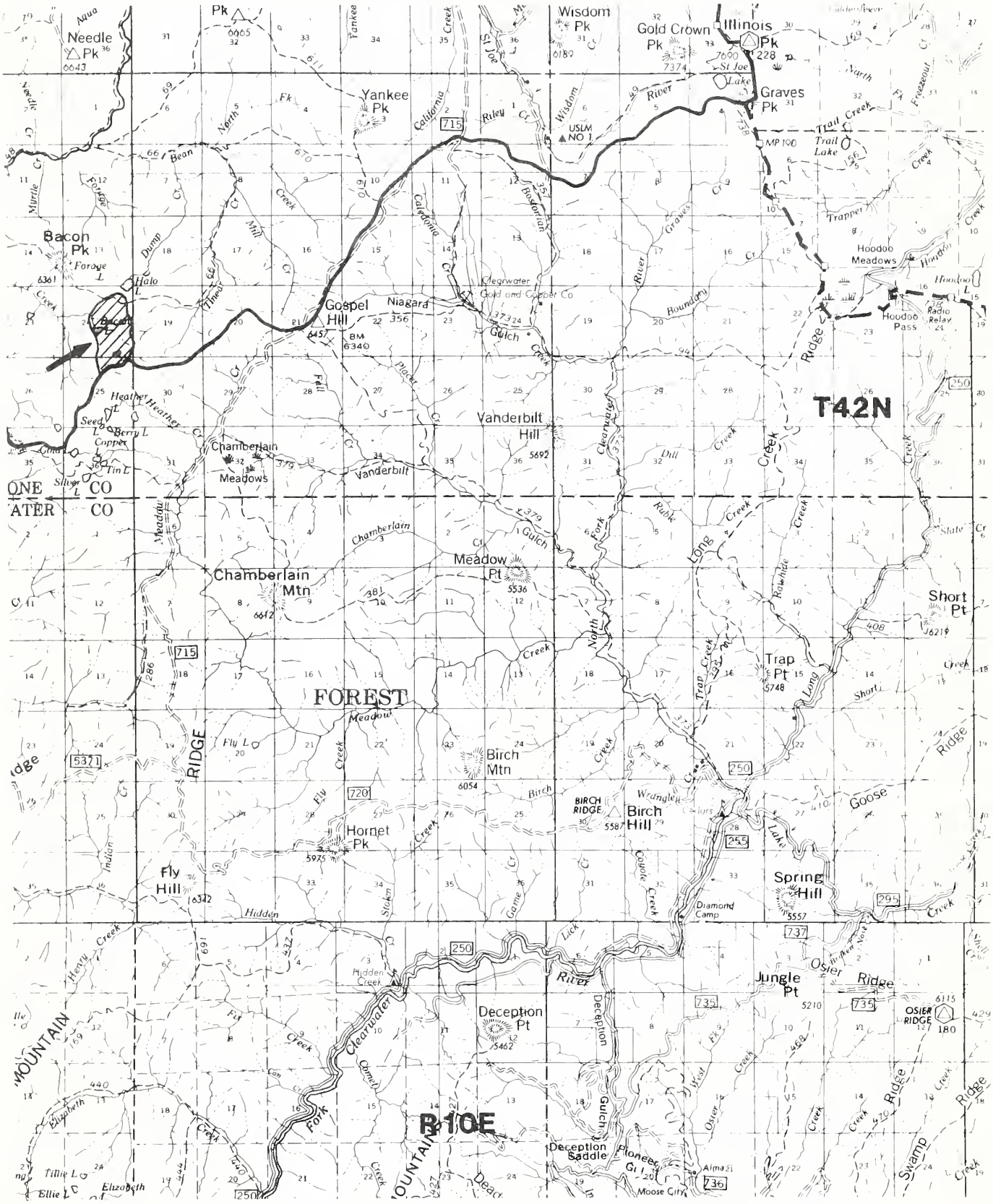
Acer glabrum, Amelanchier alnifolia, Cornus stolonifera, Menziesia ferruginea, Pachistima myrsinites, Spiraea betulifolia, Taxus brevifolia, Oplopanax horridum, Rubus parviflorus, Sorbus spp., Vaccinium spp., and Ribes spp.

About sixty herbaceous species display commonness in the forest understories and include:
Arnica latifolia, Aralia nudicaulis, Asarum caudatum, Erythronium grandiflorum, Linnaea borealis, Polystichum munitum, Clintonia uniflora, Pyrola secunda, P. asarifolia, Chimaphila umbellata, Xerophyllum tenax, Pedicularis racemosa, Tiarella trifoliata, Veratrum viride, Viola glabella and a number of fern species.

Wildlife resource studies suggest the presence of the following mammals:
Moose - Alces alces
Black bear - Ursus americanus
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Mountain lion - Felis concolor
Lynx - Lynx canadensis
Coyote - Canis latrans
Snowshoe hare - Lepus americanus

Birds:
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Spruce grouse - Canachites canadensis

FIVE LAKES BUTTE PROPOSED RNA



15. FIVE LAKES BUTTE PROPOSED

RESEARCH NATURAL

AREA

This RNA consists of a subalpine, glaciated basin containing two lakes and mountain hemlock forests. The lakes are in contrast: one has fish, the other none. Steep gradient streams, with adjacent wet meadows, are also present. Much of the basin was burned in 1910.

****

The Five Lakes Butte Research Natural Area (FLB-RNA) covers 125 ha (310 acres) in the western Bitterroot Mountains in northern ID. This RNA occupies a glaciated basin in the Belt Supergroup, sedimentary rocks. Bacon Lake, 3 ha (7.5 acres) in size, exhibits low production with a maximum depth of over 9 m (30'), and has a fish population (Salmo spp). A smaller, shallow tarn (un-named) is without fish; its size varies with the season.

Forests, varying from open to dense, are primarily dominated by mountain hemlock. Associated conifers include: whitebark pine, Engelmann spruce, subalpine fir, lodgepole pine, and some western white pine. Much of FLB-RNA's basin was burned over in 1910.

The FLB-RNA is located on the Avery District, St. Joe National Forest, Shoshone Co., ID: 46° 58' N. lat., 115° 16' W. long. The area is mapped within the Bacon Peak Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to the FLB-RNA is in the remote SE corner of the St. Joe National Forest. It may be reached from Superior, MT (80 km/50 miles to the north); take the Superior Exit from I-90, travel south on FR # 250 over Hoodoo Pass to Fly Hill; and FR # 715 north to trail westward to Five Lakes Butte. Follow trail 3 km (2 miles) between Tin Lake and Gold Lake; leave trail, go north across basin to ridge and follow it to head of Bacon Ck. FLB-RNA is the basin at head of Bacon Ck.

PHYSICAL AND CLIMATIC CONDITIONS

Five Lakes Butte RNA encompasses a cirque basin in the Bitterroot Mountains. The highest point is 2078 m (6859') at the head of the basin, down to 1727 m (5700') where Bacon Ck flows from the basin. The Precambrian metasediments have been folded and intensely faulted. The soils have formed on glacial till, with a layer of volcanic ash superimposed.

The FLB-RNA experiences a Pacific maritime climate, with the mountains intercepting an abundance of moisture. Snowfall is heavy in at the upper elevations, although winters are mild.

Cold continental air sometimes invades. The nearest climatic station is at Powell, ID, 68 km (42 miles) southeast, and 600 m (1970') lower than the RNA.). Powell's mean annual temperature is 5.8° C (42° F); mean annual precipitation is 104 cm (41"); FLB is colder and receives more moisture than Powell.

ECOLOGIC VALUES

The following forest habitat types are found on the FLB-RNA:

Tsme/Xete	ht	[48 ha/120 acres]
Tsme/Mefe	ht	[28 ha/ 68 acres]
Tsme/Phem	ct	[8 ha/ 20 acres]
Snowbank-Sedge	ct	[4 ha/ 10 acres]
Lakes		[5 ha/ 12 acres]
Rockland types		[32 ha/ 80 acres]

The forests fit into the following SAF Types:

205: Mtn. hemlock [84 ha/208 acres]

Major shrub species in FLB-RNA are: Alnus sinuata, Gaultheria humifusa, Menziesia ferruginea, Penstemon fruticosa, Ribes lacustre, Spiraea densiflora, Juniperus communis, Phyllodoce empetriformis, Vaccinium scoparium, and V. globulare.

Representative groundlayer species: Arenaria aculeata, Arnica latifolia, A. cordifolia, Boykinia major, Epilobium angustifolium, Festuca viridula, Luetkea pectinata, Pedicularis racemosa, Mitella breweri, Luzula hitchcockii, Carex geyeri, Senecio triangularis, Calamagrostis canadensis, Xerophyllum tenax, and Veratrum californicum.

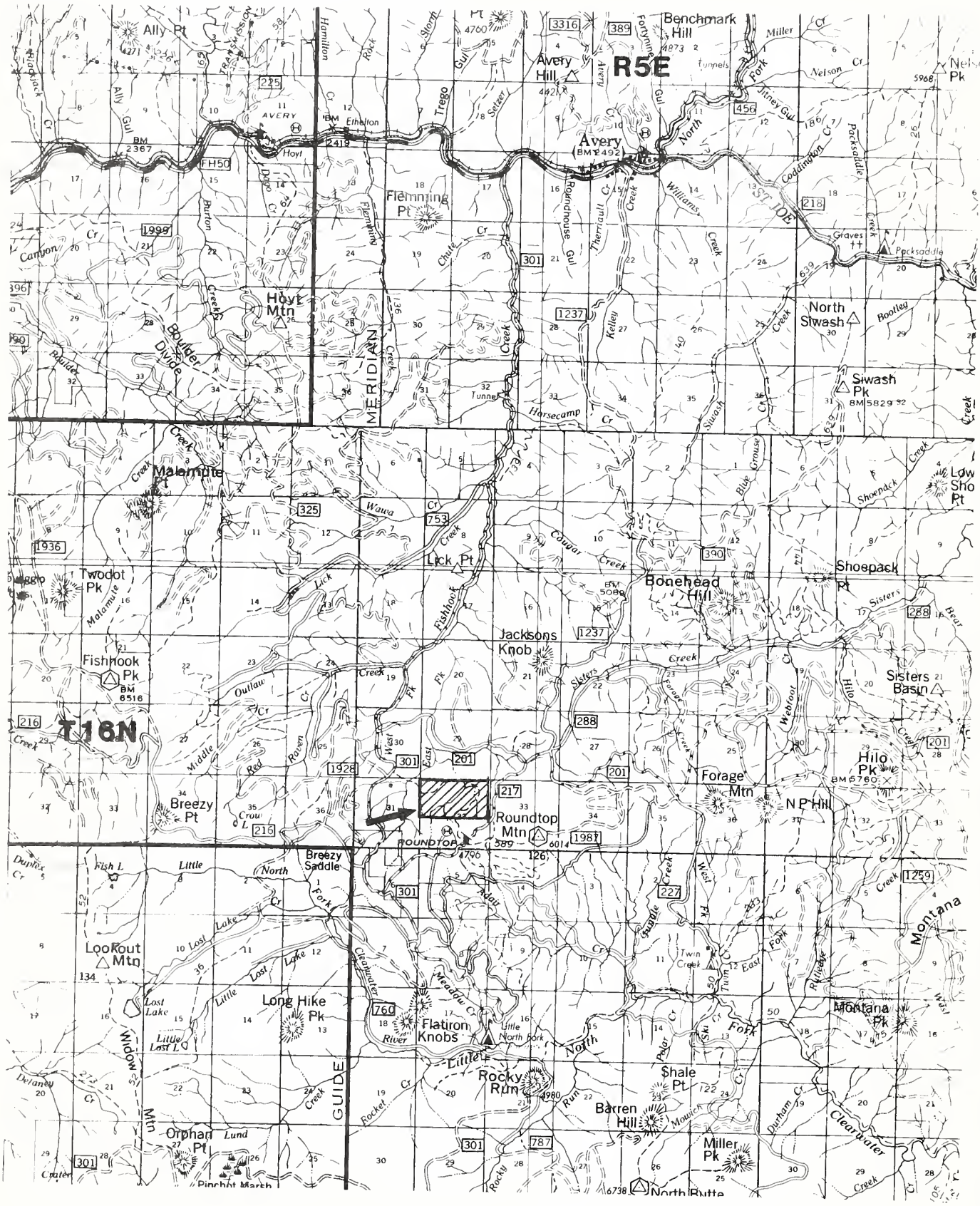
Representative mammals using the FLB-RNA include:

- Elk - Cervus canadensis
- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- Moose - Alces alces
- Porcupine - Erethizon dorsatum
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Snowshoe hare - Lepus americanus
- Pika - Ochotona princeps

Birds utilizing the FLB-RNA include:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapu obscurus
- C. swallow -Petrochelidon pyrrhonota

UPPER FISHHOOK RNA



16. UPPER FISHHOOK

RESEARCH NATURAL AREA

This RNA is composed primarily of old-growth western red cedar which has been maintained in its natural condition, although the surrounding area has been heavily logged. Many of the trees exhibit heart rot.

****

The Upper Fishhook Research Natural Area (UF-RNA) occupies a total of 129 ha (320 acres) in the upper basin of the East Fork Fishhook Ck at approximately 1363 m (4500'). The site is a moist, northerly slope and is characterized by rushing streams, dry draws, beaver ponds and boggy swamps. The dominant trees is western redcedar, many of which are 1-2 m (3-7') dbh. The cedar canopy forms a cathedral-like atmosphere. Other associates include western white pine, grand fir, Douglas-fir, western larch, subalpine fir and Engelmann spruce.

The redcedar and white pines have heart rot; the pine also is infected with blister rust. The eastern edge of UF-RNA was burned by a turn-of-the-century fire; this area has some fire-scarred redcedar.

UF-RNA is located in the Avery District, St. Joe National Forest, Shoshone Co., IDaho: 47° 07' N. lat., 115° 51' W. long. UF-RNA is mapped within the Monumental Buttes Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The UF-RNA may be reached by leaving I 90 at the Kellogg (ID) Exit and travelling south to Avery, ID located on the St. Joe River. Alternatively the area can be approached from Clarkia, ID southwest of UF-RNA. FR # 530 leads up Fishhook Ck and intersects FR # 217 which leads to the Roundtop Work Center and continues to near the eastern edge of UF-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Upper Fishhook RNA's highest point is at its eastern edge at 1467 m (4840'); the lowest point is 1260 m (4160') in the northwest corner where a tributary of the East Fork of Fishhook Creek flows from the area. Much of the UF-RNA occupies a moist, northerly slope system; several stream systems create a broken, rolling topography.

The mean annual temperature for the area is about 5° C (41° F). The mean Jan. temperature is -5° C (22° F); July averages 14.4° C (58 F). Average annual precipitation is 100 cm (40"), with 60% of this in the form of snow (175 cm/70" snowpack).

ECOLOGIC VALUES

The following forest habitat types are found in the UF-RNA:

Thpl/Atfi	ht	[125 ha/310 acres]
Thpl/Clun	ht	[" " " "]
Abgr/Clun	ht	[4 ha/ 10 acres]

The SAF Forest Cover Types:

215: W. white pine	[26 ha/ 65 acres]
228: W. redcedar	[99 ha/245 acres]
213: Grand fir	[4 ha/ 10 acres]

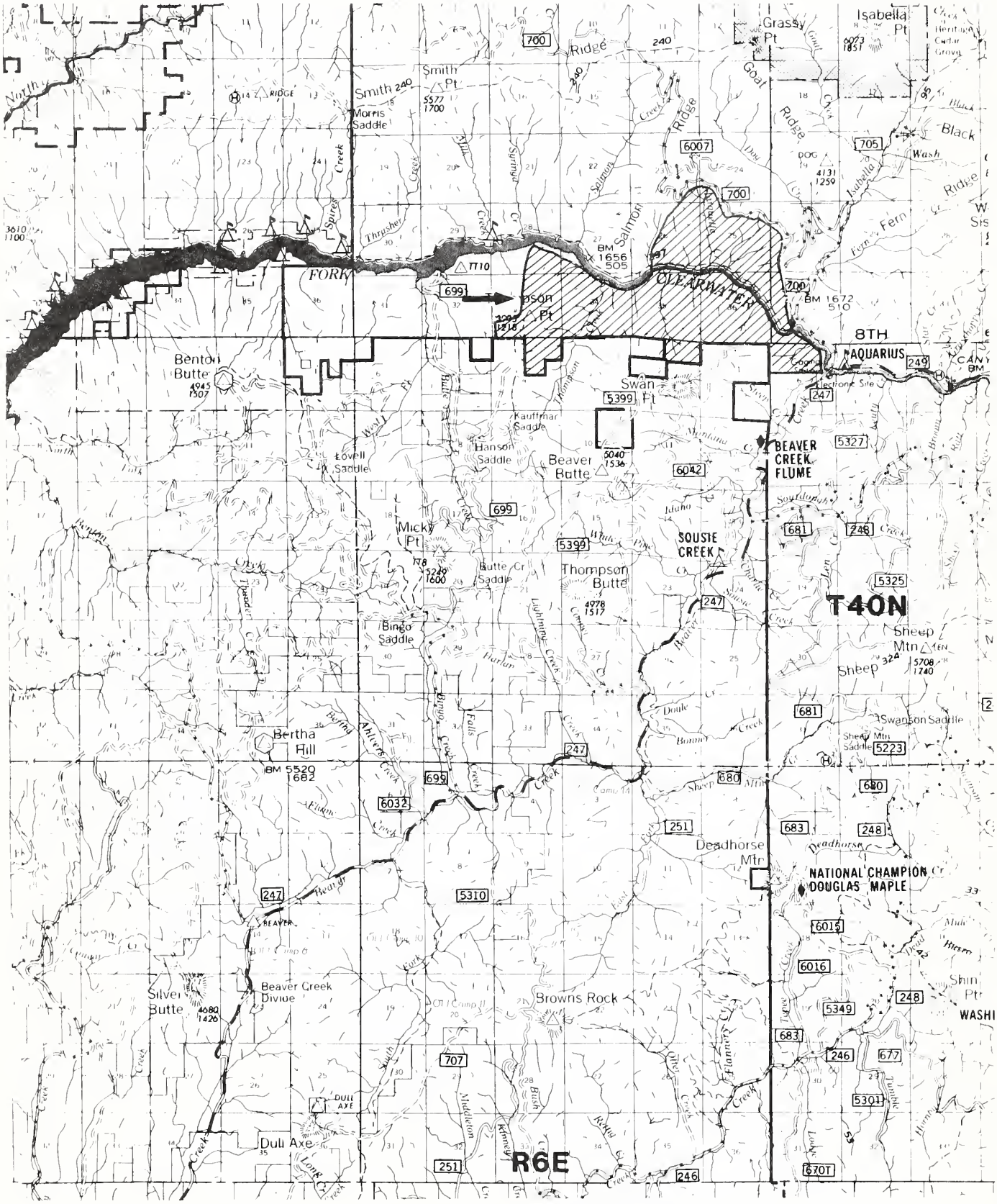
Representative shrub species in the cedar types include:
Acer glabrum, Alnus incana, Lonicera utahensis, Cornus stolonifera, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Holodiscus discolor, Philadelphus lewisii, Pachistima myrsinites, Taxus brevifolia, and Vaccinium membranaceum.

Common herbaceous species include:
Athyrium filix-femina, Adenocaulon bicolor, Botrychium virginianum, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Erythronium grandiflorum, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Gymnocarpium dryopteris, Mitella stauropetala, Aralia nudicaulis, Pyrola asarifolia, Asarum caudatum, Actaea rubra, and Xerophyllum tenax.

Mammals believed to occupy the UF-RNA area include:
Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Beaver - Castor canadensis
Black bear - Ursus americanus
Mountain lion - Felis concolor
Coyote - Canis latrans

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

AQUARIUS PROPOSED RNA



17. AQUARIUS PROPOSED

RESEARCH NATURAL

AREA

Centered on the North Fork of the Clearwater River in northern ID, this RNA supports one of the most unique and best remaining examples of coastal-related vegetation in the northern Rockies. It is a nearly complete river canyon environment with properties similar to coastal regions. Red alder forests are present as are large numbers of coastal species rare or uncommon in ID.

****

The Aquarius Research Natural Area (A-RNA) occupies 1579 ha (3900 acres) within the Clearwater River canyon upstream from the Dworshak Dam. Here an environment similar to that west of the Cascade Range has been maintained, along with a variety of coastal biota. The nature of the Pacific coastal refugia in ID has been discussed by Johnson and Steele (1978, Northwest Science, Vol. 52). The best examples of inland red alder forests occurs in A-RNA, together with other typical coniferous forests dominated by redcedar, western larch, western white pine, grand fir and Douglas-fir.

There are several dozen groundlayer plants occurring in the A-RNA that are known or believed to be coastal disjuncts. Others are suspected of being nearby or possibly present in this RNA. Nearly half of all the ferns native to Idaho are believed to occur in A-RNA. Preliminary studies also suggest the existence of an unusual aquatic fauna.

Elevations range from 488 m (1600') at Dworshak Reservoir to 1218 m (3995') at Thompson Point. The terrain is steep and rugged. A-RNA is located on the North Fork District of the Clearwater National Forest, Clearwater Co., ID: 46° 51' N. lat., 115° 40' W. long. The area is mapped on the Thompson Point Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Aquarius RNA is located NE of Orofino, ID and may be reached travelling to Headquarters, ID via several available roads; the Beaver Ck Rd # 247 is taken to the eastern boundary near the Aquarius crossing of the Clearwater River. Other roads provide access to A-RNA sites on either side of the river, including the upper reaches. Trail # 297 follows the northside of the river. Access by power boat on the reservoir is also possible. Camping is available at the Aquarius Campground.

PHYSICAL AND CLIMATIC CONDITIONS

A-RNA is situated in steep, rugged terrain. Landslides and slumps characterize the slopes, with alluvial and colluvial fans along portions of the river. Often steep slopes extend directly to the river edge.

The climate represents the warm, moist extreme of forest environments in Idaho; wet-site vegetation is maintained. Partial weather records from an inundated station indicate: mean Jan. temperature is -0.6° C (31° F); Aug. average is 20.2° C (68.5° F), and a yearly mean of 9.0° C (48.3° F). Mean annual precipitation was measured at 110 cm (43").

ECOLOGIC VALUES

The following forest habitat types are found in the A-RNA:

Psme/Phma	ht	[77 ha/ 190 acres]
Abgr/Clun	ht	[154 ha/ 380 acres]
Thpl/Clun	ht	[397 ha/ 980 acres]
Thpl/Adpe	ht	[644 ha/1590 acres]
Thpl/Atfe	ht	[198 ha/ 490 acres]
Thpl/Opho	ht	[77 ha/ 190 acres]
Aquatic types		[32 ha/ 80 acres]

The SAF Forest Cover Types:

213: Grand fir	[134 ha/ 330 acres]
228: W. redcedar	[109 ha/ 270 acres]
212: Larch-D.fir	[474 ha/1170 acres]
210: Douglas-fir	[449 ha/1110 acres]
215 W. White pine	[125 ha/ 310 acres]
221 Red alder	[146 ha/ 360 acres]
Noncommerical	[73 ha/ 180 acres]

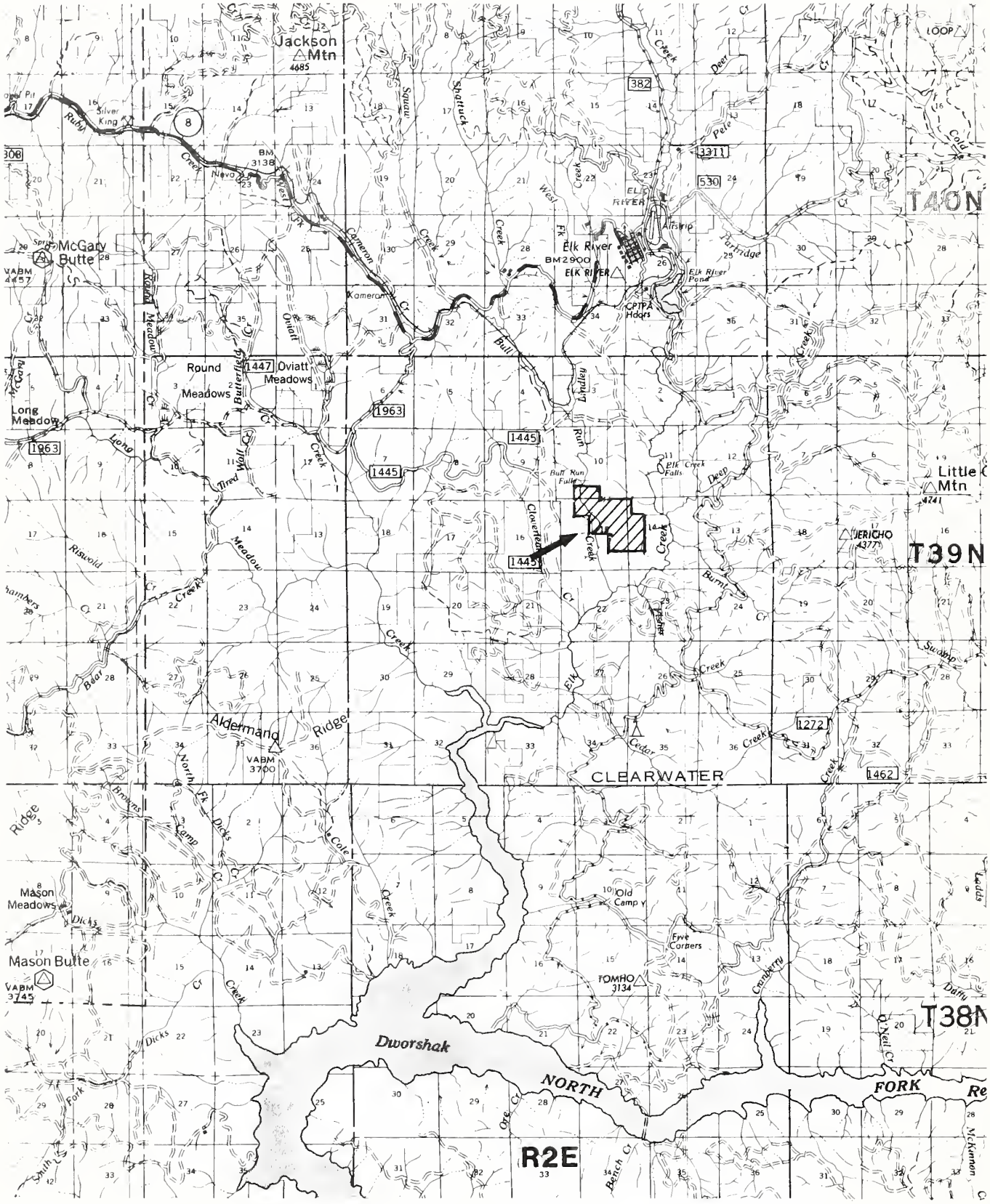
Representative plant species with limited distributions in or near A-RNA: Adiantum pedatum, Alnus rubra, Artemisia douglasiana, Betula papyrifera var. subcordata, Botrychium virginianum, Penstemon ovatus, Boykinia major var. intermedia, Dryopyteris arguta, Equisetum telmateia, Eburophyton austinae, Trientalis latifolia, Rubus ursinus var. macropetalis, Lycopodium selago, Collomia heterophylla, Rubus nivalis, Carex hendersonii, Cypripedium fasiculatum, Cardamine constancei, Polypodium hesperium, Waldsteinia idahoensis, Bolandra oregona, Synthyris platycarpa, Penstemon ovatus, Viola sempervirens, and Stenanthium occidentale.

Mammals common in the A-RNA
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White tailed deer - O. virginianus
Moose - Alces alces
Black bear - Ursus americanus
Mountain lion - Felis concolor

Avifauna include:

Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
Osprey - Pandion haliaetus
Golden eagle - Aquila chrysaetos

BULL RUN CREEK PROPOSED RNA



18. BULL RUN CREEK PROPOSED

RESEARCH NATURAL

AREA

Located in northern Idaho, this RNA supports western redcedar forests occupying soils derived from basalt rock substrate. Is is on a fringe of country that supports Pacific Coastal plants, some occurring as disjuncts. Grand fir and Douglas-fir communities are also present.

****

The Bull Run Creek Research Natural Area (BRC-RNA) occupies a total of 151 ha (373 acres) at the north edge of the Clearwater embayment of Columbia River lava flows which encroached on a rugged terrain produced by the uplift and erosion of older rocks. Bull Run Ck has cut through the lava. BRC-RNA supports plant communities growing on soils derived from basalt rock, as well as loess and volcanic ash. Western redcedar habitat types on basalt is unique among RNA's in this region. Some parts of the BRC-RNA have thin soils and support climaxes of grand fir and Douglas-fir.

The area once supported coastal disjunct plant species, but the Dworshak Reservoir has inundated part of these ranges, leading to their loss. An island of grasses, forbs, and shrubs on shallow soil and surrounded by forest but not maintained by fire is also present. In addition Bull Run Ck is a moderately steep gradient stream with many rapids and riffle pools. There are also two small, permanent ponds in the southeastern corner of BRC-RNA.

BRC-RNA is located on the Palouse District of the St. Joe National Forest, Clearwater Co. ID: 46° 44' N. lat., 116° 11' W. long. BRC-RNA is mapped within the Elk Creek Falls Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The BRC-RNA may be reached by way of Idaho Hwy # 8 to within 3 km (2 miles) of Elk River. Turn south on FR # 1452 for 3 km (2 miles) to junction with road toward Elk Ck Falls; continue on FR # 1452 another 1.6 km (one mile) to bridge over Bull Run Ck. About 90 m (300') before bridge park at old haul road, travel by foot 1 km to RNA boundary and continue to Tick Ridge. Only game trails penetrate BRC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Bull Run Ck RNA's highest point is on Tick Ridge at 896 m (2940'); the lowest point is along Bull Run Ck as it flows from BRC-RNA at 668 m (2190'). The RNA is made up of a plateau-like ridge (Tick Ridge), with steep stream breaklands produced by stream cutting; "hill country" with basalt talus and cliffs.

BRC-RNA has an inland maritime climate but summers are sunny and dry; Jul.-Aug. are peak fire-danger months. Winters are cloudy and moist, and have deep snow. Some continental climate influence also occurs. Elk River, ID, 6.4 km (4 miles) north of BRC-RNA provides climatic data: Apr.-Oct. temperature averages 11.6° C (52.8° F), with July mean of 17.2° C (63.0° F). Midwinter temperature averages -4.1° C (24.6° F). Mean annual precipitation is 98 cm (38"), with July August below 2 cm each (under 1").

ECOLOGIC VALUES

The following forest habitat types are found in the BRC-RNA:

Thpl/Atfi	ht	[4 ha/ 10 acres]
Thpl/Clun	ht	[69 ha/170 acres]
Thpl/Gydr	ht	[" " " "]
Thpl/Asca	ht	[" " " "]
Abgr/Phma	ht	[49 ha/120 acres]
Abgr/Asca	ht	[" " " "]
Abgr/Clun	ht	[" " " "]
Psme/Phma	ht	[12 ha/ 30 acres]

The SAF Forest Cover Types:

210: Douglas-fir	[49 ha/120 acres]
213: Grand fir	[81 ha/200 acres]
228: W. redcedar	[4 ha/ 10 acres]

Representative shrub species include: Acer glabrum, Alnus sinuata, Berberis repens, Linnaea borealis, Cornus stolonifera, Pachistima myrsinites, Rubus parviflorus, Holodiscus discolor, Rosa sp., Philadelphus lewisii, Vaccinium membranaceum, Physocarpus malvaceus, Sambucus racemosa, Menziesia ferruginea, Symphoricarpos albus, and Ceanothus sanguineus.

Common herbaceous species include: Adiantum pedatum, Adenocaulon bicolor, Balsamorhiza sagittata, Arnica cordifolia, Clintonia uniflora, Coptis occidentalis, Cornus canadensis, Eburophyton austinae, Polystichum munitum, Galium triflorum, Gymnocarpium dryopteris, Mimulus clivicola, Athyrium filix-femina, Pyrola secunda, Asarum caudatum, Trillium ovatum, Veratrum californicum, Pseudoroegneria spicatum and Festuca idahoensis.

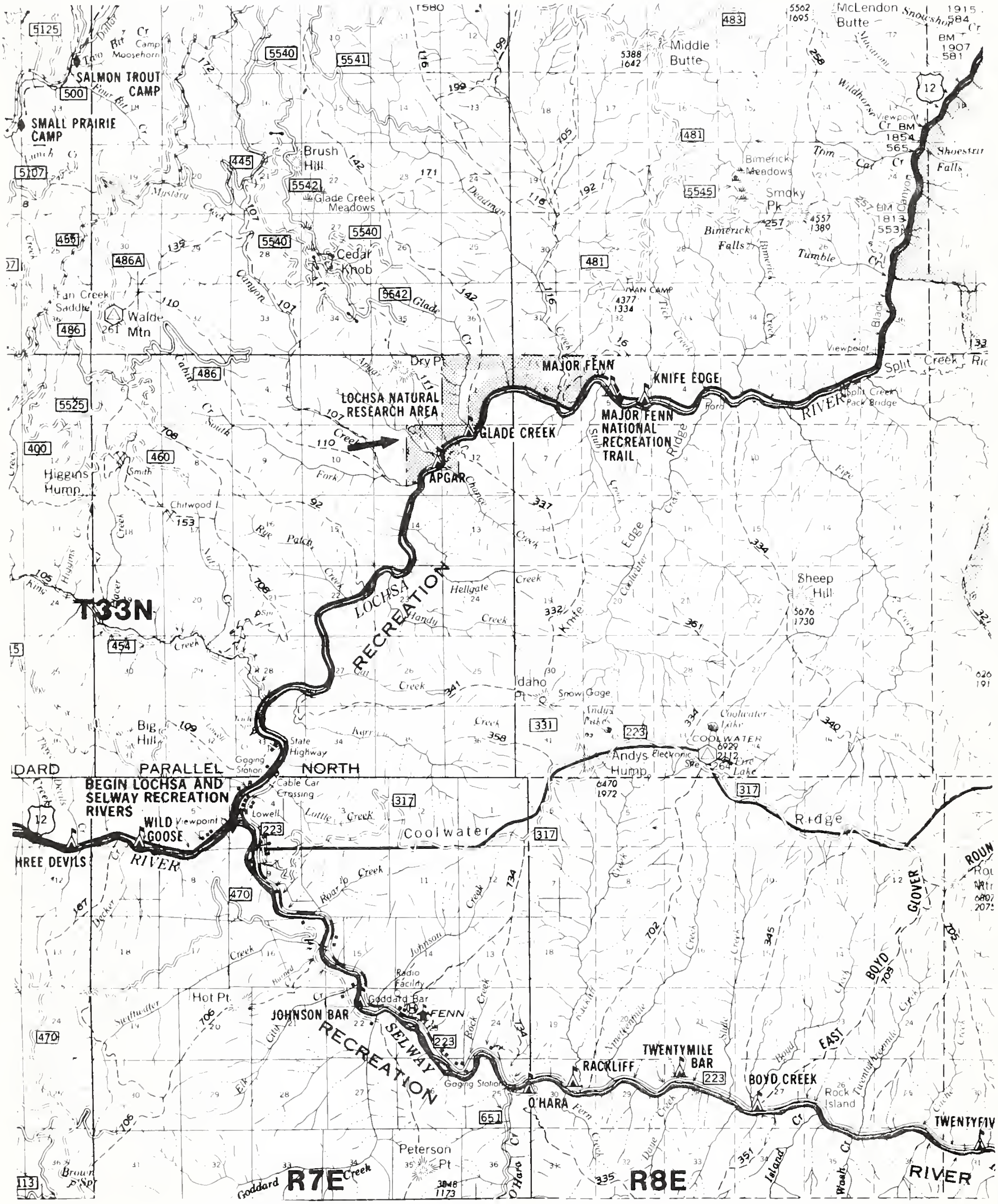
Mammals believed to occupy the BRC-RNA area include:

Mule deer - Odocoileus hemionus
White-tailed Deer - O. virginianus
Beaver - Castor canadensis
Black bear - Ursus americanus
Mountain lion - Felis concolor
Coyote - Canis latrans
River otter - Lutra canadensis
Marten & Fisher - Martes spp.

Avifauna include:

Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
Pil. woodpecker - Dryocopus pileatus
Osprey - Pandion haliaetus

LOCHSA RNA


SALMON TROUT CAMP
SMALL PRAIRIE CAMP
Brush Hill
Glade Creek Meadows
Cedar Knob
Fun Creek Saddle
Walde Mtn
McLendon Butte
Middle Butte
Bimerick Meadows
Smoky Pk
Bimerick Falls
Tumble Cr
Shoestring Falls
Dry Pt
MAJOR FENN
KNIFE EDGE
LOCHSA NATURAL RESEARCH AREA
GLADE CREEK
APGAR
MAJOR FENN NATIONAL RECREATION TRAIL
Split Creek Pack Bridge
RIVER
Higgins Hump
T33N
LOCHSA RECREATION
Sheep Hill
Idaho Pt
Snow Gage
Andys Lake
Coolwater Lake
COOLWATER
Andys Hump
Big Hill
State Highway
PARALLEL
NORTH
BEGIN LOCHSA AND SELWAY RECREATION RIVERS
Cable Car Crossing
Lowell
WILD GOOSE
HREE DEVILS
RIVER
Coolwater
Ridge
GLOVER
BOYD
EAST
Radio Facility
Goddard Bar
FENN
Hot Pt.
JOHNSON BAR
SELWAY
RECREATION
Gaging Station
O'HARA
RACKLIFF
TWENTYMILE BAR
BOYD CREEK
Rock Island
TWENTYFIV
Peterson Pt
R7E
R8E
RIVER

19. LOCHSA

RESEARCH NATURAL AREA

This northern ID natural area supports disjunct vegetation types representative of Pacific Coast plant communities. Featured is the flowering dogwood which is joined by ten other species that are rarely found inland. Conifers include Douglas-fir, grand fir, and western redcedar. Seral brush fields occupy over 10% of the total area.

****

The Lochsa Research Natural Area (L-RNA) occupies 519 ha (1281 acres) divided into two units situated on either side of the Lochsa River in north ID's Clearwater Mtns. That part of the Lochsa drainage supporting the L-RNA is typical of the general region in its features related to geology, climate and fire history. However this RNA encompasses a portion of the refugium within which coastal species have survived since being isolated following the uplift of the Cascade Mountains during the Pliocene. The featured species are flowering dogwood (Cornus nuttallii) and red alder (Alnus rubra). The dogwood's ecology has been studied by L.A. Roper, 1970, "Synecology of Cornus nuttallii in northern ID", MS thesis, University of ID.

Associated conifers include, grand fir, redcedar, Douglas-fir, and ponderosa pine. The brush fields were generated by past wildfires, and flowering dogwood exists as a dominant in these fields along with other common shrub species listed elsewhere in this L-RNA digest.

Elevations range from 484 m (1600') at riverside, to 846 m (2827'). The L-RNA is located on the Lochsa District of the Clearwater National Forest, ID Co., ID: 46° 13' N. lat., 115° 32' W. long. The area is mapped within the USGS Lowell Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The L-RNA is located on the Lewis & Clark Hwy # 12 near Lowell, ID. The site is adjacent to the Apgar and Glade Ck Campgrounds. The area on the north side of the Lochsa river is referred to as the Canyon Deadman Unit and the area to the south as the Chance Ck Unit. Three different trail systems serve the larger, northern unit of the L-RNA; the smaller, southern unit is not trailed, but can be reached simply by hiking from Apgar Campground.

PHYSICAL AND CLIMATIC CONDITIONS

L-RNA is situated in a steep-sided canyon, severely stream cut. Metasedimentary rocks underlie the area, and have been exposed along the Lochsa River. Soils are shallow to deep loams, all well drained.

The closest climatic station is the Fenn Ranger Station, 14 km (8.5 miles) east of L-RNA. Mean annual precipitation is 85 cm (34"), with a pronounced summer (July-Sept.) dry period. Midsummer temperatures average 22° C (71° F); midwinter averages - 1° C (30° F). Overall the climate is moderate.

ECOLOGIC VALUES

The following forest habitat types are found in the L-RNA:

Thpl/Clun	ht	[415 ha/1025 acres]
Abgr/Clun	ht	[78 ha/ 192 acres]
Psem/Phma	ht	[26 ha/ 64 acres]

The SAF Forest Cover Types:

213: Grand fir	[48 ha/120 acres]
228: W. redcedar	[9 ha/ 23 acres]
237: Ponderosa pine	[6 ha/ 16 acres]
210: Douglas-fir	[14 ha/898 acres]
Brushfields	[54 ha/133 acres]

Major shrub species include: Acer glabrum, Amelanchier alnifolia, Ceanothus sanguineus, Holodiscus discolor, Philadelphus lewisii, Prunus emarginata, Rhamnus purshiana, Rubus parviflorus, Sorbus scopulina, and Rosa gymnocarpa.

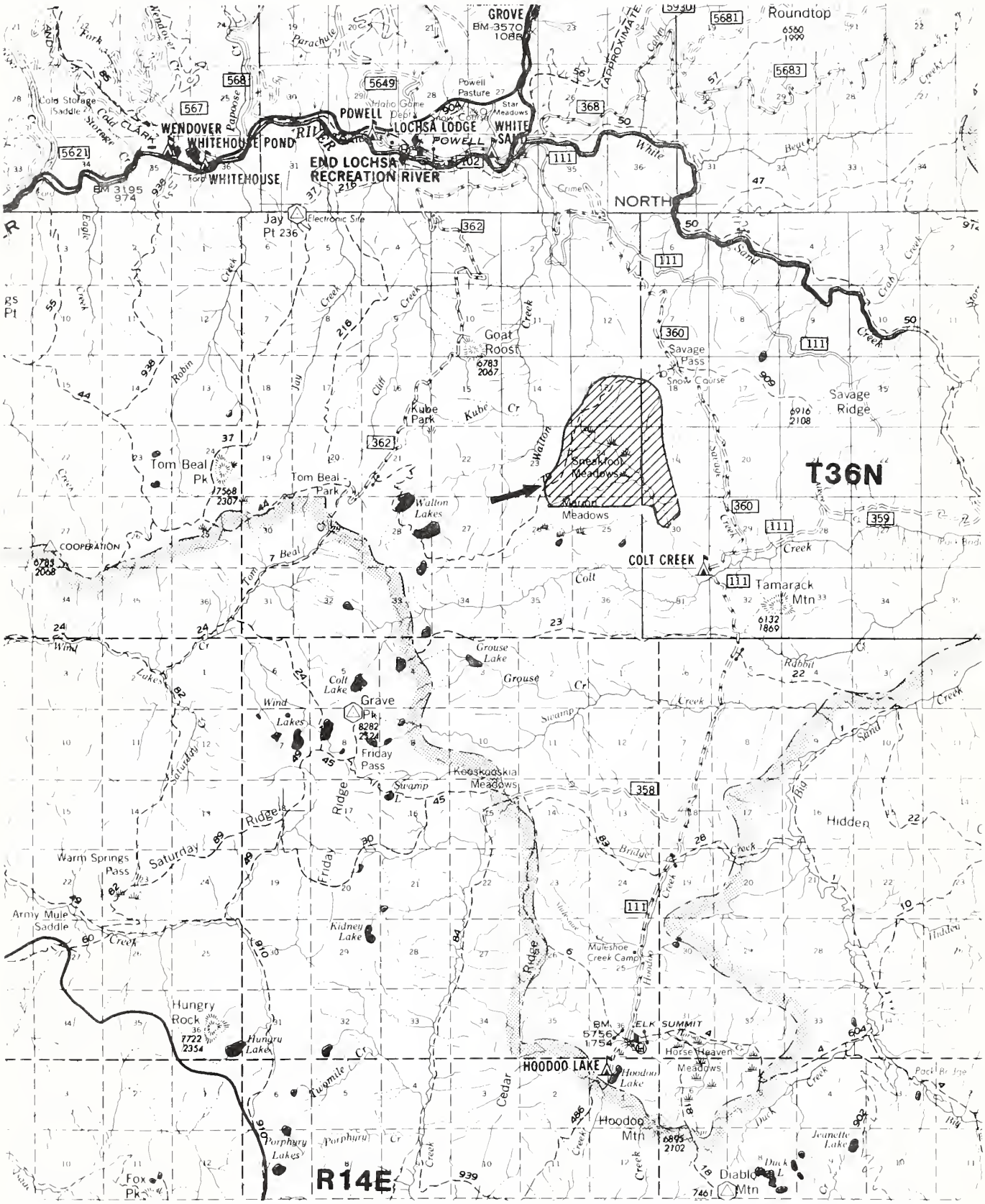
Disjunct herbaceous species include Eburophyton austinae, Carex californica, Botrychium virginianum, Penstemon ovatus, Boykinea major var. intermedia, Equisetum telmateia, Trientalis latifolia, Rubus ursinus var. macropetalis, Lycopodium selago, Collomia heterophylla, Rubus nivalis, and Carex hendersoni

Endemic plant species include: Dasynotus daubenmirei, Cypripedium fasiculatum, Cardamine constancei, Waldsteinia idahoensis, Sellaginella douglasii, Bolandra oregona, Penstemon flavescens, and Calochortus elegans var. selwayensis.

Mammals common in the L-RNA:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

SNEAKFOOT MEADOWS PROPOSED RNA



20. SNEAKFOOT MEADOWS PROPOSED

RESEARCH NATURAL

AREA

This RNA is composed of a wet meadow complex occupying a flat glaciated basin in the northern Bitterroot Mtns. in northern ID. The site occurs at about 1800 m (6000'), and covers 820 ha (2024 acres). The area has several spruce-fir zone forest types as well as wetlands and a low gradient stream. Both elk and moose make heavy use of the meadows and adjacent conifer cover. This RNA supports an endangered species of Tolfieldia.

****

The Sneakfoot Meadows Research Natural Area (SM-RNA) features a variety of sedge meadows and sphagnum bogs surrounded by several kinds of subalpine fir forest habitat types, plus old growth Engelmann spruce. A herd of moose numbering 30-40 head use the SM-RNA as a calving ground and summer range. Although the spruce stands do not reveal evidence of recent fire, the other subalpine sites do; on these latter areas lodgepole pine and western larch dominate.

The SM-RNA is located on the Elk Summit Unit of the Powell District, Clearwater National Forest, Idaho Co., ID: 46° 25' N. lat., 114° 40' W. long. It is mapped on the USGS Grave Peak Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

SM-RNA may be reached by using the Lewis & Clark Hwy # 12 to Powell, ID. The Elk Summit Rd # 360 is taken to the general vicinity of SM-RNA. Primary access to the meadows and adjacent forests is by Forest Service Trail # 79 which originates at Savage Pass. This trail follows the northern and western edges of the natural area. Alternatively, a trail (un-numbered) from Colt Ck. campground leads into the southern part of SM-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

SM-RNA is located in the mountainous portion of northern ID, just north of the Selway-Bitterroot Wilderness. It exists within the path of moist maritime air masses. It's estimated that the RNA receives about 100-112 cm (40-45") of annual precipitation, much of it as snow between Nov. and Jan. Snow course data from Savage Pass indicate the occurrence of 2.5 m (100") of snow remain in early spring. Summer temperatures do not exceed 32° C (90° F), and midwinter monthly averages are about -7° C (20° F).

SM-RNA borders on the ID Batholith (granodiorite & quartz monzonite). The wet meadow area consist of fine organic detritus and silt with short reaches of fine gravel. The water flowing through is low in dissolved solids, and has a specific conductivity of 36.6 ohms and alkalinity of 11 ppm.

ECOLOGIC VALUES

The following forest habitat types are found on the SM-RNA:

Abla/Mefe-Vasc ht	[518 ha/1280 acres]
Abla/Xete-Vasc ht	[131 ha/ 324 acres]
Abla/Caca-Legl ht	[81 ha/ 200 acres]
Wet Meadows	[89 ha/ 220 acres]

About 76% of SM-RNA's forest cover belongs to SAF Cover Type # 206, spruce-fir. An additional 13% falls within Cover Type # 218, lodgepole pine.

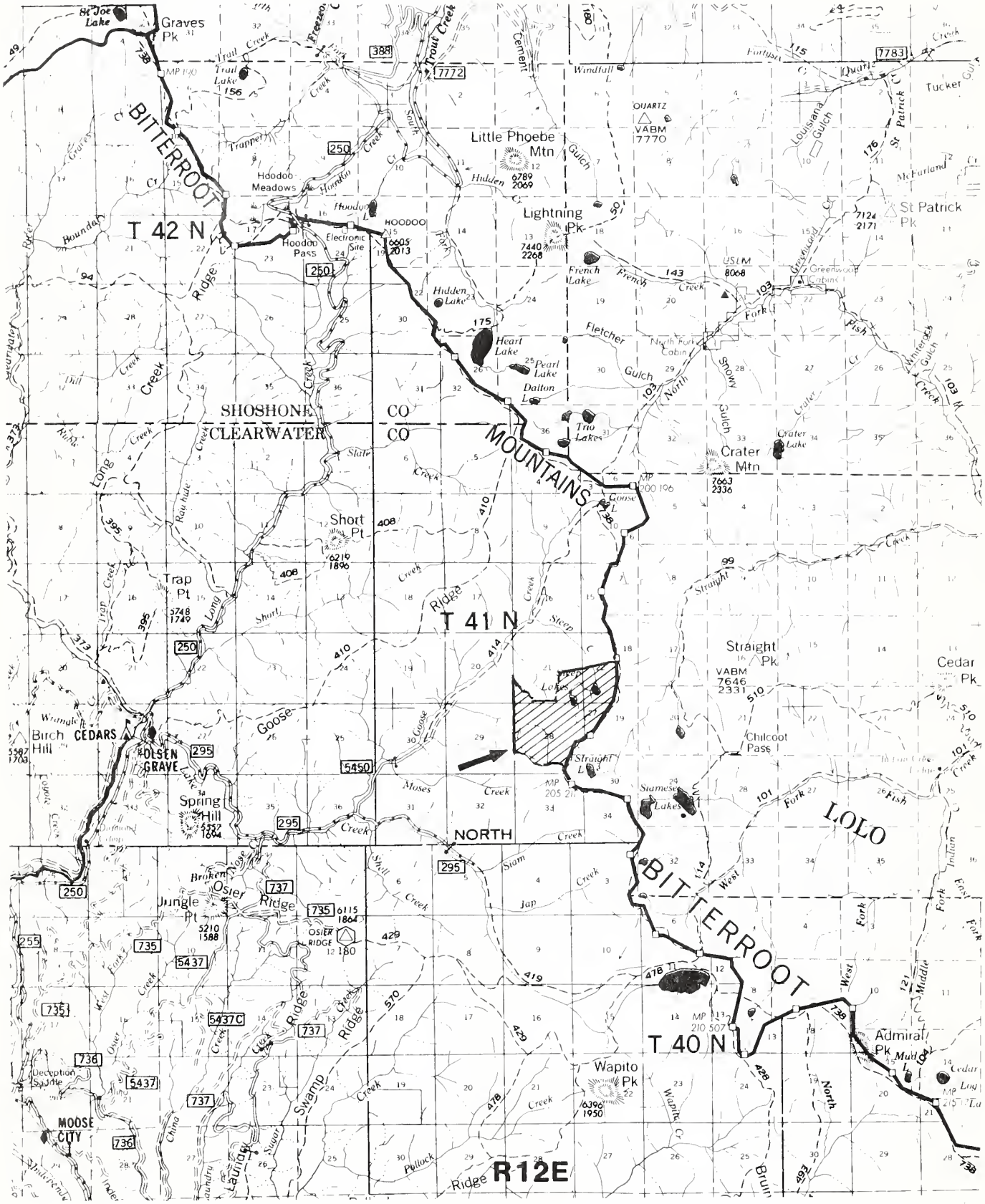
Major shrub species in SM-RNA are: Alnus sinuata, Ledum glandulosum, Phyllodoce empetriformis, Vaccinium scoparium, V. caespitosum, V. occidentale, Kalmia microphylla, Ribes hudsonianum, Rubus parviflorus, and Sambucus racemosa.

Representative groundlayer species: Agrostis scabra, Anemone piperi, Athyrium filix-femina, Carex aquatilis, Boykinia major, Coptis occidentalis, Clintonia uniflora, Danthonia intermedia, Eriophorum chamissonis, Erigeron coulteri, Galium triflorum, Gentiana calycosa, Habenaria saccata, Listera cordata, Mertensia bella, Tolfieldia glutinosa, and Xerophyllum tenax.

Mammals using SM-RNA include:
Moose - Alces alces
Elk - Cervus canadensis
W-t. deer - Odocoileus virginianus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Mink - Mustela vison
Marten - Martes americana
Wolverine - Gulo gulo
Coyote - Canis latrans

Birds utilizing the SM-RNA:
Common raven - Corvus corax
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
C's. nutcracker - Nucifraga columbiana
Mtn. chickadee - Parus gambeli
Pine grosbeak - Pinicola enucleator
Pine siskin - Spinus pinus

STEEP LAKES PROPOSED RNA



21. STEEP LAKES PROPOSED

RESEARCH NATURAL

AREA

Steep Lakes RNA includes a pair of high elevation lakes, mountain hemlock and subalpine forests, and two drainages with different fire histories. One lake possesses golden trout, the other has no fish; one lake possesses an abundance of freshwater shrimp, the other has a near absence of this organism. Wet meadows are also present.

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The Steep Lakes Research Natural Area (SL-RNA; 317 ha/784 acres) is located on the ID-MT stateline in the Bitterroot Mountains. Elevations range from 1753 m (5750') up to 2222 m (7290'). Lower Steep Lake (1856 m/6090') possesses a population of stocked (1962) golden trout (Salmo aguabonito), as well as an abundance of a freshwater shrimp (Gammarus lacustris); Upper Steep Lake (2012 m/6600') has no trout and a low number of the shrimp. The zooplankters Diaptomus shoshone and D. arapahoensis are present only in the upper lake. Most benthic species are smaller in the lake stocked with fish.

The surrounding forests are dominated by mountain hemlock and subalpine fir. Some whitebark pine and Sitka alder communities are also present in SL-RNA. Other conifers present are: lodgepole pine, Engelmann spruce, and Douglas-fir.

The SL-RNA supports the usual assortment of mammals and birds (see listing), but it is possible the area also supports, at times, the endangered gray wolf (Canis lupus).

The SL-RNA is located on the Kelly Ck District, Clearwater National Forest, Clearwater Co., ID, in the recommended Hoodoo Wilderness: 46° 52' N. lat., 114° 57' W. long. The area is mapped within the Straight Peak Quadrangle, 15' series.

ACCESS AND ACCOMMODATIONS

Access to the SL-RNA is by road and trail during the summer months. The trailhead is 160 km (100 miles) from Missoula, MT; 64 km (40 miles) from Superior, Montana. From Superior on I-90, take FR # 250 over Hoodoo Pass, and FR # 5450 up Goose Ck to its end; take the Steep Lakes Trail to SL-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

SL-RNA is located in rugged mountain country along the crest of the Bitterroot Range in northern ID. The lake basins were carved by alpine glaciers. Rocks are quartzites and argillites.

SL RNA experiences a strong inland maritime climate, with the mountains intercepting an abundance of moisture. The highest points receive an estimated 200 cm (80") annually, mostly as snow in winter and early spring. Mean annual temperature at the highest sites are near 0° C (32° F); winters are cloudy (30% possible sunshine); summers reach 80% possible sunshine. The nearest weather station is at Powell Ranger Station 43 km (27 miles) SE of Steep Lakes, but at a lower elevation (1107 m/3632').

ECOLOGIC VALUES

Steep Lakes Basin was burned in 1910 and has sparse tree cover; South Basin with older stands did not burn in 1910. The following forest types are present:

Abla/Clun	ht	[16 ha/ 40 acres]
Abla/Xete	ht	[32 ha/ 80 acres]
Abla/Mefe	ht	[68 ha/167 acres]
Abla/Luhi	ht	[2 ha/ 5 acres]
Tsme/Xete	ht	[2 ha/ 5 acres]
Tsme/Mefe	ht	[49 ha/120 acres]
Tsme/Luhi	ht	[2 ha/ 5 acres]
Sitka Alder	ct	[12 ha/ 30 acres]

The forests fit into the following SAF Types:

205: Mtn hemlock	[53 ha/130 acres]
206: Spruce-fir	[118 ha/292 acres]
208: Whitebark pine	[t ha/ t acres]

Major shrub species in SL-RNA are: Acer glabrum, Alnus sinuata, Cornus stolonifera, Menziesia ferruginea, Pachistima myrsinites, Phyllodoce empetriformis, Vaccinium scoparium, and V. membranaceum.

Representative groundlayer species: Adenocaulon bicolor, Anemone occidentalis, Claytonia lanceolata, Clintonia uniflora, Cystopteris fragilis, Dodecatheon jefferyi, Hedysarum occidentale, Luzula hitchcockii, Festuca idahoensis, Pedicularis contorta, Ranunculus eschscholtzii, Xerophyllum tenax, Saxifraga bronchialis, Trollius laxus, Caltha leptosepala, and Mertensia longiflora.

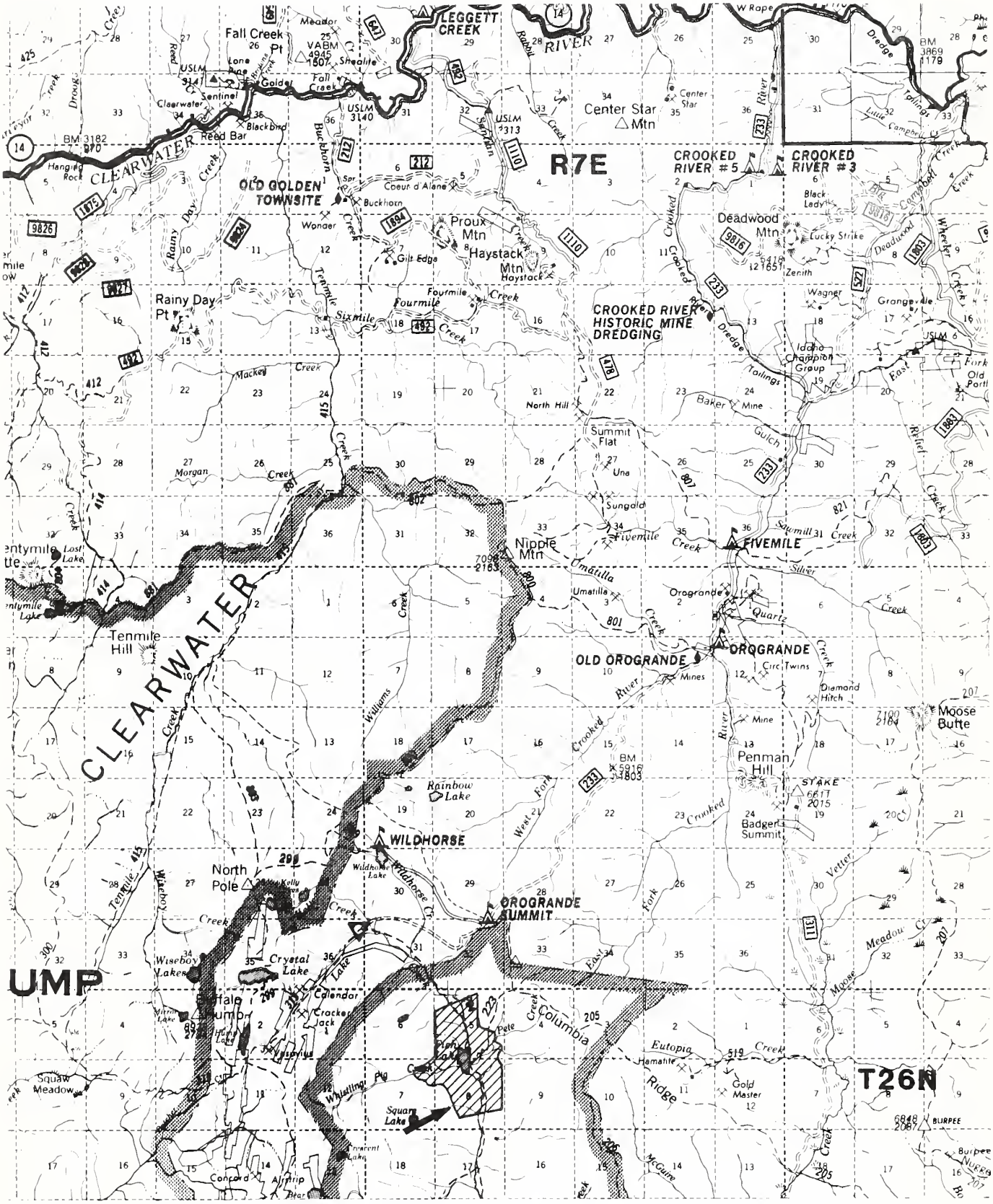
Representative mammals using the SL-RNA include:

- Moose - Alces alces
- Coyote - Canis latrans
- Gray wolf - Canis lupus
- Elk - Cervus canadensis
- W-t. deer - Odocoileus virginianus
- Black bear - Ursus americanus
- Pika - Ochotona princeps
- Marmot - Marmota caligata
- Mtn lion - Felis concolor
- Snowshoe hare - Lepus americanus
- Bobcat - Lynx rufus

Birds believed to use SL-RNA are:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus
- Chickadee - Parus gambeli
- C. nutcracker - Nucifraga columbiana

FISH LAKE PROPOSED RNA



22. FISH LAKE PROPOSED

RESEARCH NATURAL

AREA

This RNA features a steep-walled glacier-formed trough containing a 12 ha (29 acres) productive lake, as well as moose habitat. Wet meadows and forests of subalpine fir, Engelmann spruce, Douglas-fir and lodgepole pine are present on terrain surrounding Fish Lake. Meadows are dominated by bluejoint reedgrass and beaked sedge.

****

Fish Lake Research Natural Area (FL-RNA) covers 305 ha (754 acres) in the Gospel Hump Wilderness, northcentral Idaho. Fish Lake is a productive, naturally-stocked lake, 12 ha (29 acres) in area, containing rainbow and brook trout, and frequented by moose. Wet meadows and gentle to steep gradient streams are also present.

The valleys of both Lake Creek and Whistling Pig Creek are steep-walled glacial troughs; glaciers left an extensive boulderfield moraine below Fish Lake. A variety of cover and habitat types exist within FL-RNA. The major tree species are lodgepole pine, Douglas-fir, Engelmann spruce and subalpine fir. Meadow communities are dominated by bluejoint reedgrass and beaked sedge. The morainal rockfield sites support menziesia and juniper.

The FL-RNA is located in Gospel-Hump Wilderness on the Red River District, Nezperce National Forest, Idaho Co., ID: 45° 37' N. lat., 115° 37' W. long. The area is mapped within the Buffalo Hump and Silver Spur Ridge Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to the FL-RNA is by road and trail during the snow-free season. The trailhead is at the crossing of Forest Rd (FR) # 233 over Lake Ck, 105 km (65 miles) from Grangeville, ID, on Hwy 95. From Grangeville take State Hwy # 14 up the South Fork of the Clearwater River 73 km (45 miles), then take FR # 233 to Lake Ck. Take Trail # 204 5 km (3 miles) to Fish Lake.

PHYSICAL AND CLIMATIC CONDITIONS

Fish Lake RNA lies in a deep, glacially carved valley in the Buffalo Hump region of the Clearwater Mtns; the lake is a moraine-dammed water body in the center of the wide, low gradient valley bottom of Lake Ck. Adjacent slopes rise steeply and abruptly.

The FL-RNA has a Pacific maritime climate, with the mountains intercepting an abundance of moisture. Snowfall is heavy at the upper elevations, although winters are relatively mild. Cold continental air sometimes invades. The nearest climatic station is at Dixie, ID 14 km (8 miles) southeast of the RNA but at about the same elevation. Mean annual temperature is 2.1° C (35.8° F); midsummer temperatures average 13° C (55° F) and midwinter -8° C (16° F). Annual precipitation averages 80 cm (31"), with midsummer months averaging only 3 cm (1.2") each. Dec.-Jan. both receive about 11 cm (4-4.5") each as snow.

ECOLOGIC VALUES

The following habitat and community types are found on the FL-RNA:

Abla/Mefe	ht	[2 ha/ 5 acres]
Abla/Xete	ht	[231 ha/570 acres]
Abla/Stam	ht	[30 ha/ 75 acres]
Abla/Caca	ht	[2 ha/ 5 acres]
Psme/Caru	ht	[8 ha/ 20 acres]
Caca/Caro	ct	[6 ha/ 15 acres]
Mefe/Juco	ct	[8 ha/ 20 acres]
Cliffs/Rocks		[6 ha/ 15 acres]
Lake		[12 ha/ 29 acres]

The forests are included in the following SAF cover types:

206: Spruce-fir	[32 ha/ 80 acres]
210: Douglas-fir	[20 ha/ 50 acres]
218: Lodgepole pine	[221 ha/545 acres]

Major shrub species in FL-RNA are: Alnus sinuata, Acer glabrum, Amelanchier alnifolia, Menziesia ferruginea Juniperus communis, Ribes lacustre, Sorbus scopulina, Juniperus communis, Ledum glandulosum, Lonicera involucrata, Rhamnus alnifolia, Sambucus racemosa, Vaccinium scoparium, and V. globulare.

Representative groundlayer species: Achillea millefolium, Arnica cordifolia, Aconitum columbianum, Angelica arguta, Anemone piperi, Athyrium filix-femina, Coptis occidentalis, Cornus candensis, Luzula hitchcockii, Carex geyeri, Parnassia fimbriata, Calamagrostis rubescens, Valeriana sitchensis, Smilacina racemosa, Danthonia intermedia, Oryzopsis exigua, and Xerophyllum tenax.

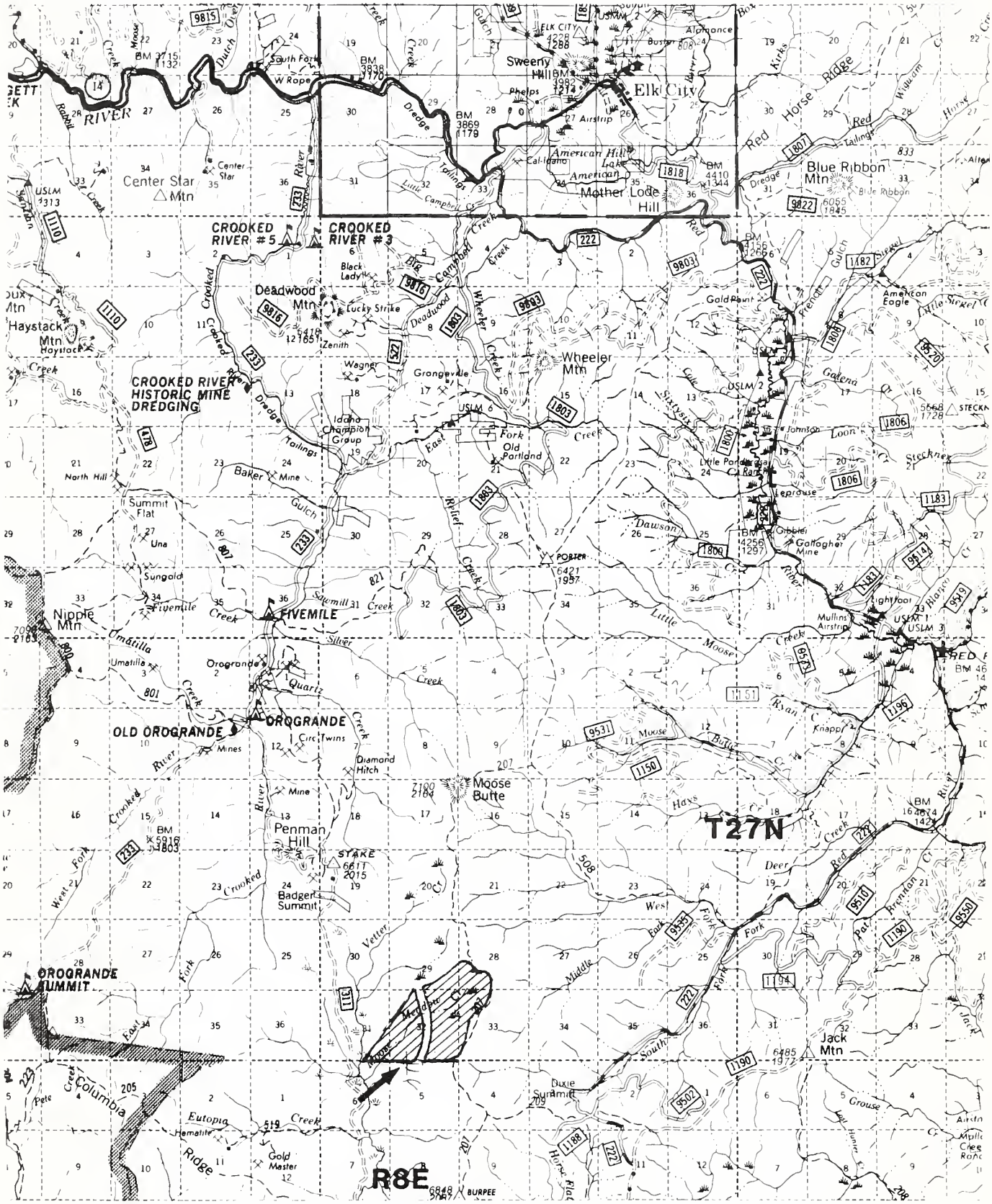
Representative mammals in the FL-RNA include:

- Elk - Cervus canadensis
- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- Moose - Alces alces
- Pika - Ochotona princeps
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Snowshoe hare - Lepus americanus
- Porcupine - Erethizon dorsatum

Birds utilizing the FL-RNA include:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus

MOOSE MEADOW CREEK RNA



23. MOOSE MEADOW CREEK

RESEARCH NATURAL AREA

This RNA consists of a wetland system at moderately high elevations, featuring an assortment of wet meadows and sphagnum bogs, plus a moderate gradient stream and a variety of mature spruce-fir zone forest communities. The Pacific Giant Salamander has been observed here.

****

The Moose Meadows Ck Research Natural Area (MMC-RNA) covers 405 ha (1000 acres). Collectively the wet meadows are floristically diverse, varying from sphagnum bogs to grass and sedge wet meadows. The meadows are located primarily along stream courses; some are on side slopes, and some are positioned on upper benches and even ridges. Moose Meadow Ck is a sparkling, clear stream winding its way through the meadows in places and through a rocky channel of moderate gradient. The Pacific giant salamander (Dicamptodon ensatus) has been noted as present in this stream.

Forests are composed of mature lodgepole pine, subalpine fir, and Engelmann spruce. The mountain pine beetle (Dendroctonus ponderosae) has caused high lodgepole pine mortality in MMC-RNA; one can predict its ultimate loss from the area. The bog sites support: Mountain bog gentian (Gentiana calycosa), slender bog orchid (Habenaria saccata), and Washington mimulus (Mimulus washingtonensis).

The MMC-RNA is located on the Red River District, Nezperce National Forest, Idaho Co., ID: 45° 38' N. lat., 115° 30' W. long. The area is mapped within four 7.5' Quadrangles: Orogrande, Moose Butte, Silver Spur Ridge and Dixie.

ACCESS AND ACCOMMODATIONS

MMC-RNA is reached via ID Hwy # 14 east of Grangeville, ID, taken to the mouth of Crooked River; then continue on FRs # 233 and # 311 over Badger Summit to Big Ck Meadows. FH # 311 follows the west side of Big Ck Meadows to Moose Meadows Ck. Trail # 207 follows along the ridge forming the eastern boundary of MMC-RNA. This RNA is 14.5 air km (9 air miles) from the Red River Ranger Station, and about 97 km (60 miles) from Grangeville, ID.

PHYSICAL AND CLIMATIC CONDITIONS

Moose Meadow Creek RNA is embedded in the large mountain mass composing central ID. The elevations range from 1951 m (6400') in the RNA's southwest corner to 2263 m (7425'). The region was subjected to some local alpine glaciation probably during the Pinedale Subage. Some slopes are steep, but the head of the drainage basin is relatively gentle.

Weather records for Dixie, ID, 8 km (5 miles) from MMC-RNA apply reasonably well, although this station is lower (1710m/5610'). The area is influenced by maritime, as well as continental air masses. Snowfall is heavy in the mountains and may linger until June. Dixie records are as follows: mean annual temperature is 2.1° C (35.8° F); midsummer averages about 16° C (60° F) and winters -6.0° C (22° F). Annual precipitation is 83 cm (33") with midsummer months experiencing droughty conditions.

ECOLOGIC VALUES

The following forest habitat types are found on the MMC-RNA:

Abla/Xete	ht	[172 ha/425 acres]
Abla/Mefe	ht	[78 ha/192 acres]
Abla/Cabi	ht	[81 ha/200 acres]
Abla/Cooc	ht	[44 ha/108 acres]
Abla/Caca	ht	[6 ha/ 15 acres]
Abla/Stam	ht	[t ha/ t acres]
Meadows/Bogs		[24 ha/ 60 acres]

The forests fit into the following SAF Cover Types:

206: Spruce-Fir	[41 ha/100 acres]
218: Lodgepole pine	[340 ha/840 acres]

Major shrub species in MMC-RNA are: Alnus sinuata, Betula glandulosa, Amelanchier alnifolia, Gaultheria humifusa, Ribes lacustre, Spiraea betulifolia, Menziesia ferruginea, Ledum glandulosum, Symphoricarpos albus, Vaccinium globulare, V. occidentale, and V. scoparium.

Representative groundlayer species: Calamagrostis candensis, Carex geyeri, C. rostrata, Glyceria grandis, Juncus covillei, Aconitum columbianum, Arnica latifolia, Caltha biflora, Dodecatheon jeffreyi, Erigeron perigrinus, Gentiana calycosa, Habenaria saccata, Mimulus spp., Saxifraga spp., Pedicularis spp., Senecio spp., Veratrum viride, and Xerophyllum tenax.

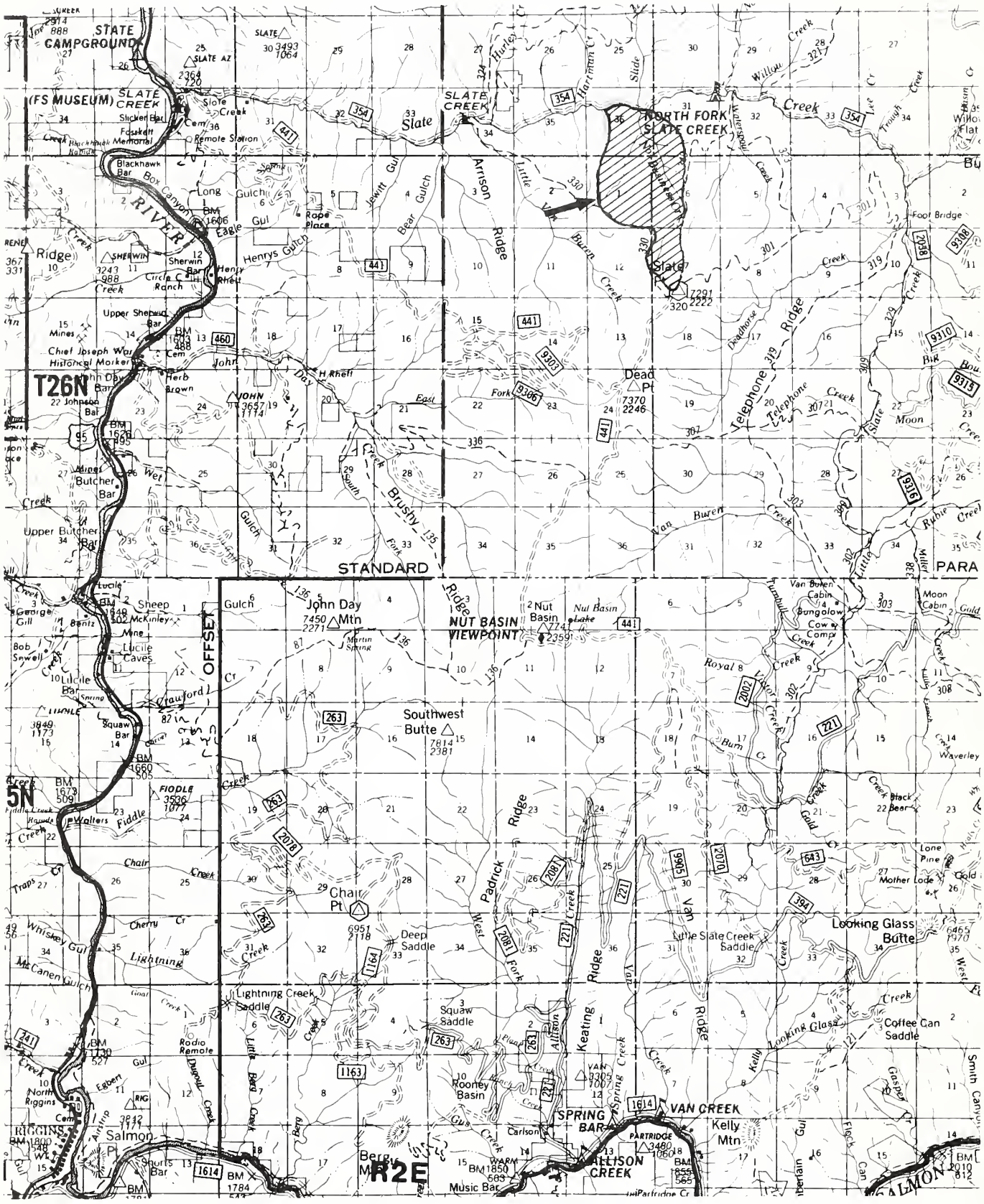
Representative mammals using the MMC-RNA include:

- Elk - Cervus canadensis
- Black bear - Ursus americanus
- Mule deer - Odocoileus hemionus
- Moose - Alces alces
- Porcupine - Erethizon dorsatum
- Mtn. lion - Felis concolor
- Bobcat - Lynx rufus
- Snowshoe hare - Lepus americanus
- Marten - Martes americana

Birds utilizing the MMC-RNA:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Blue grouse - Dendragapus obscurus

NO BUSINESS CREEK PROPOSED RNA



24. NO BUSINESS CREEK PROPOSED

RESEARCH NATURAL AREA

This RNA consists of a steep, forested, mountainous area in the lower Salmon River country of northern ID, and features mature grand fir stands, combined with other conifers. The area supports one of the widest assortments of grand fir habitat types, along with Douglas-fir and subalpine fir types. This RNA supports a number of interesting species including the tailed frog.

****

No Business Ck Research Natural Area (NBC-RNA) occupies 550 ha (1360 acres) in the lower Salmon River drainage. The site supports a great diversity of forest habitat types many of which are dominated by grand fir; twelve in all. Some are in the Douglas-fir climax series, and others in the subalpine fir series. NBC-RNA has a number of plant species infrequently encountered at this latitude: maidenhair fern (Adiantum pedatum), western yew (Taxus brevifolia) and white alder (Alnus rhombifolia).

NBC-RNA also contains the largest mountain mahogany (Cerococarpus ledifolius var. intercedens) known for ID. A tailed frog (Ascaphus truei) population inhabits No Business Ck; this frog requires clear, cold mountain streams. The geology of NBC-RNA is complex and unusual for the region. The water's pH is the highest measured among ID's RNAs.

Elevations range from 768 m (2520') on Slate Creek to 2194 m (7200') near Slate Point. NBC-RNA is located on the Salmon River/Slate Creek District of the Nez Perce National Forest, Idaho Co., ID: 45° 37' N. lat., 116° 09' W. long. The area is mapped within the McKinzie Creek and John Day Mountain Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The NBC-RNA is not far off highway # 95, and is accessible via the Slate Ck FR # 354 during non-winter months, as well as via FR # 441 from Slate Ck Ranger Station on Hwy # 95 to Slate Point. A foot log exists at the NW corner of the RNA to provide access across Slate Ck. Several trails provide the means of traversing NBC-RNA. Do not enter without appropriate maps.

PHYSICAL AND CLIMATIC CONDITIONS

NBC-RNA encompasses the complete No Business Ck watershed, a tributary of Slate Creek in the Salmon River Canyon. The drainage has a north aspect and is narrow and steep, dropping about 1550 m (4750') in 4 km (2.5 miles). Calcareous and gneissic rocks are present.

The nearest climatic station is at Riggins, ID, 26 km (16 miles) southwest of NBC-RNA; the RNA is wetter and colder than this station. Riggins' mean annual precipitation is 42 cm (16.5"), July-Aug. are dry and warm: 2 cm (0.7") per month; 25° C (78° F). Midwinter temperature averages 5.1° C (34° F). This part of ID has a diminished Pacific maritime climatic influence.

ECOLOGIC VALUES

The following forest habitat types are found in the NBC-RNA:

Abla/Mefe	ht	[45 ha/110 acres]
Abla/Clun	ht	[10 ha/ 25 acres]
Abla/Xete	ht	[42 ha/105 acres]
Abgr/Adpe	ht	[2 ha/ 5 acres]
Abgr/Asca	ht	[41 ha/100 acres]
Abgr/Cooc	ht	[36 ha/ 90 acres]
Abgr/Clun	ht	[202 ha/500 acres]
Abgr/Libo	ht	[t ha/ t acres]
Abgr/Xete	ht	[4 ha/ 10 acres]
Abgr/Phma	ht	[57 ha/140 acres]
Psme/Phma	ht	[61 ha/150 acres]
Psme/Syal	ht	[2 ha/ 5 acres]
Pipo/Agsp	ht	[16 ha/ 40 acres]
Cele/Agsp	ht	[12 ha/ 30 acres]
Glne/Agsp	ht	[4 ha/ 10 acres]
Agsp/Feid	ht	[12 ha/ 30 acres]
Rockland types		[4 ha/ 10 acres]

The SAF Forest Cover Types:

206: Spruce-fir	[61 ha/150 acres]
210: Douglas-fir	[81 ha/200 acres]
213: Grand fir	[302 ha/745 acres]
218: Lodgepole pine	[61 ha/150 acres]
237: Ponderosa pine	[16 ha/ 40 acres]

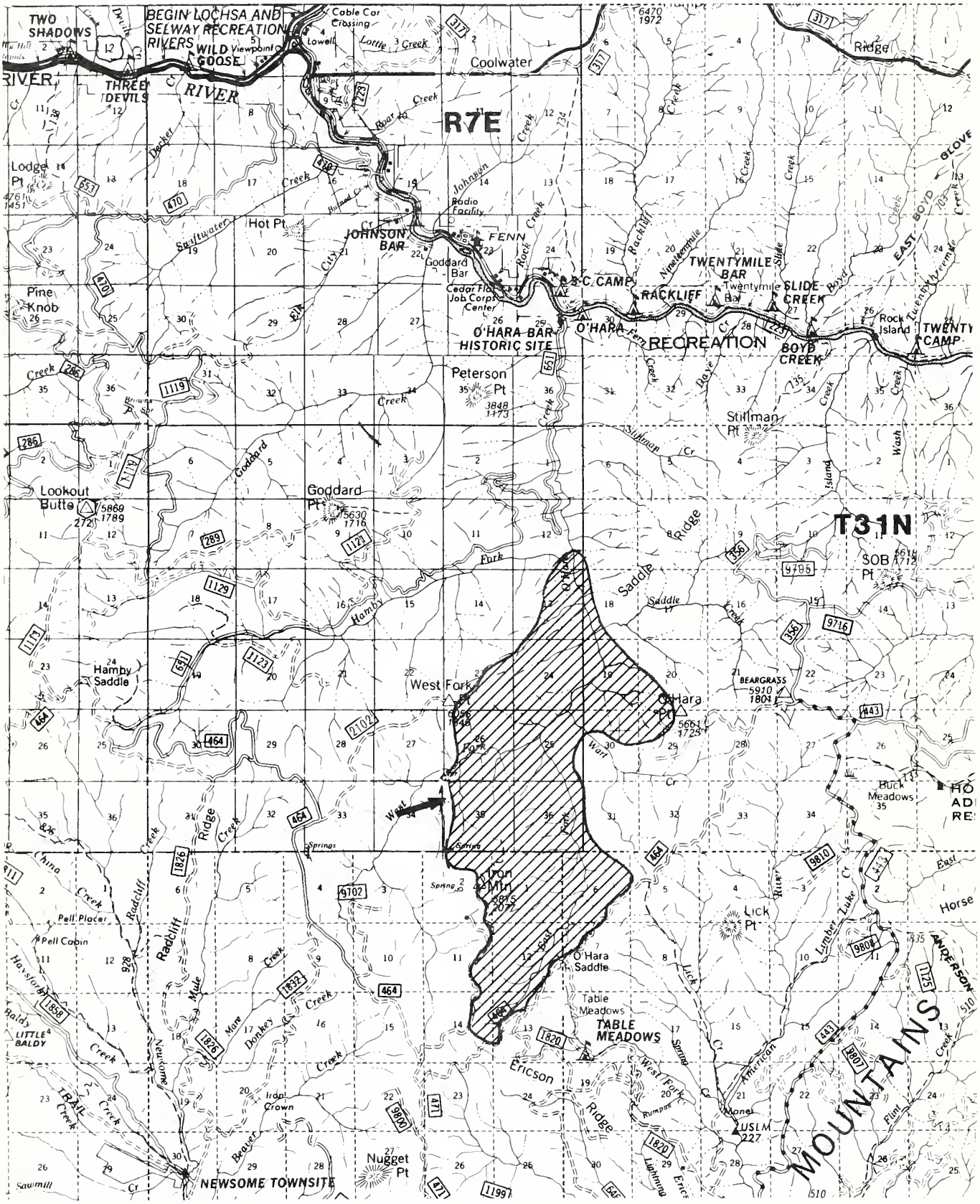
Representative shrub species include: Acer glabrum, Amelanchier alnifolia, Cercocarpus ledifolius, Glossopetalon nevadense, Holodiscus discolor, Philadelphus lewisii, Physocarpus malvaceus, Rhamnus purshiana, Rubus parviflorus, Symphoricarpos albus, Menziesia ferruginea, Rosa gymnocarpa, Taxus brevifolia, Vaccinium globulare, and V.scoparium.

Major herbaceous species include: Achillea millefolium, Adenocaulon bicolor, Adiantum pedatum, Arnica cordifolia, Asarum caudatum, Athyrium filix-femina, Boykinia major, Clintonia uniflora, Coptis occidentalis, Galium triflorum, Gymnocarpium dryopteris, Penstemon wilcoxii, Phlox diffusa, Pyrola secunda, Tiarella trifoliata, Trillium ovatum, Xerophyllum tenax, Pseudoroegneria spicata, Festuca idahoensis, Calamagrostis rubescens, and Carex geyeri.

Mammals common in the NBC-RNA:
Elk - Cervus canadensis
Deer - Odocoileus spp.
Moose - Alces alces
Porcupine - Erethizon dorsatum
Black bear - Ursus americanus
Bobcat - Lynx rufus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

O'HARA CREEK RNA



25. O'HARA CREEK

RESEARCH NATURAL

AREA

This RNA encompasses most of an entire drainage system in northern ID supporting a wide assortment of aquatic and terrestrial forest features typical of the northern Rockies. Both lower and upper forests zones are represented: Douglas-fir, grand fir, western redcedar and subalpine fir. Streams range from first to fifth order.

****

The O'Hara Ck Natural Area (OC-RNA) occupies 2834 ha (7000 acres) spans the upper and lower parts of the East Fork O'Hara Creek and parts of adjacent drainages. The aquatic system is the primary feature of OC-RNA; there exists: (1) a system of streams ranging from first to fifth order; O'Hara Creek supports an anadromous fish population, (2) a series of cascades and waterfalls along steep gradients and through narrow canyons, (3) beaver dams, ponds and colonies, and (4) wet streamside meadows used by elk and moose.

The OC-RNA and the adjacent area supports unique and/or rare plant species that either survived the glacier-age climate and/or as geographic (coastal) disjuncts; Synthris platycarpa, Equisetum telmateia, and Lycopodium selago represent three such species known to occur in OC-RNA, and others are likely to occur. The major tree species include: grand fir, lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce.

Elevations in OC-RNA range from 636 m (2100') at the northern boundary, to 2064 m (6815') atop Iron Mountain. The OC-RNA is located on the Selway District of the Nezperce National Forest, Idaho Co., ID: 46 00' N. lat., 115 30' W. long. The area is mapped within the following 7.5' series quadrangle maps: Goddart Point, Stillman Point, Lick Point and Iron Mountain.

ACCESS AND ACCOMMODATIONS

The OC-RNA is reached from Hwy # 12, travelling south on FR # 223 following the Selway River. The O'Hara Ck Rd # 651 is followed to near the northern boundary; other roads (FR # 443 from Selway Falls, and FR # 464) approach the OC-RNA from other sides. Trails # 338 and # 713 provide foot access into the interior parts.

PHYSICAL AND CLIMATIC CONDITIONS

OC-RNA is characterized by steep mountain slopes with narrow benches along major stream bottoms. It exists within the border zone of the Idaho Batholith. The rock consist of quartzites, schists, and gneisses.

The closest climatic station is the Fenn Ranger Station, 6 km (4 miles) north of OC-RNA. Mean annual precipitation is 85 cm (34"), with a pronounced summer (July-September) dry period. Midsummer temperatures average about 22 C (71 F); midwinter averages -1 C (30 F). Overall the climate at the lower elevations is moderate; at the upper limits of OC-RNA moisture is greater and much is in the form of snow.

ECOLOGIC VALUES

The following forest habitat types are found in the OC-RNA:

Psme/Phma	ht	[449 ha/1110 acres]
Thpl/Adpe	ht	[121 ha/ 300 acres]
Psme/Rock	ht	[243 ha/ 600 acres]
Abgr/Xete	ht	[53 ha/ 130 acres]
Thpl/Clun	ht	[276 ha/ 730 acres]
Abla/Clun	ht	[231 ha/ 570 acres]
Abla/Xete	ht	[170 ha/ 420 acres]
Abla/Mefe	ht	[174 ha/ 430 acres]
Abgr/Thpl	Complex	[1097 ha/2710 acres]

The SAF forest cover types:

213: Grand fir	[478 ha/1180 acres]
210: Douglas-fir	[1199 ha/2960 acres]
218: Lodgepole	[441 ha/1090 acres]
206: Spruce-fir	[105 ha/ 260 acres]
Nonforested	[611 ha/1510 acres]

Major shrub species are believed to include:

Acer glabrum, Amelanchier alnifolia, Ceanothus sanguineus, Holodiscus discolor, Philadelphus lewisii, Menziesia ferruginea, Prunus emarginata, Rhamnus purshiana, Rubus parviflorus, Sorbus scopulina, Rosa gymnocarpa, Vaccinium globulare, and Spiraea betulifolia.

Rare plant species include:
Selway Synthyris: Synthris platycarpa
Giant Horsetail: Equisetum telmateia
Clubmoss: Lycopodium selago

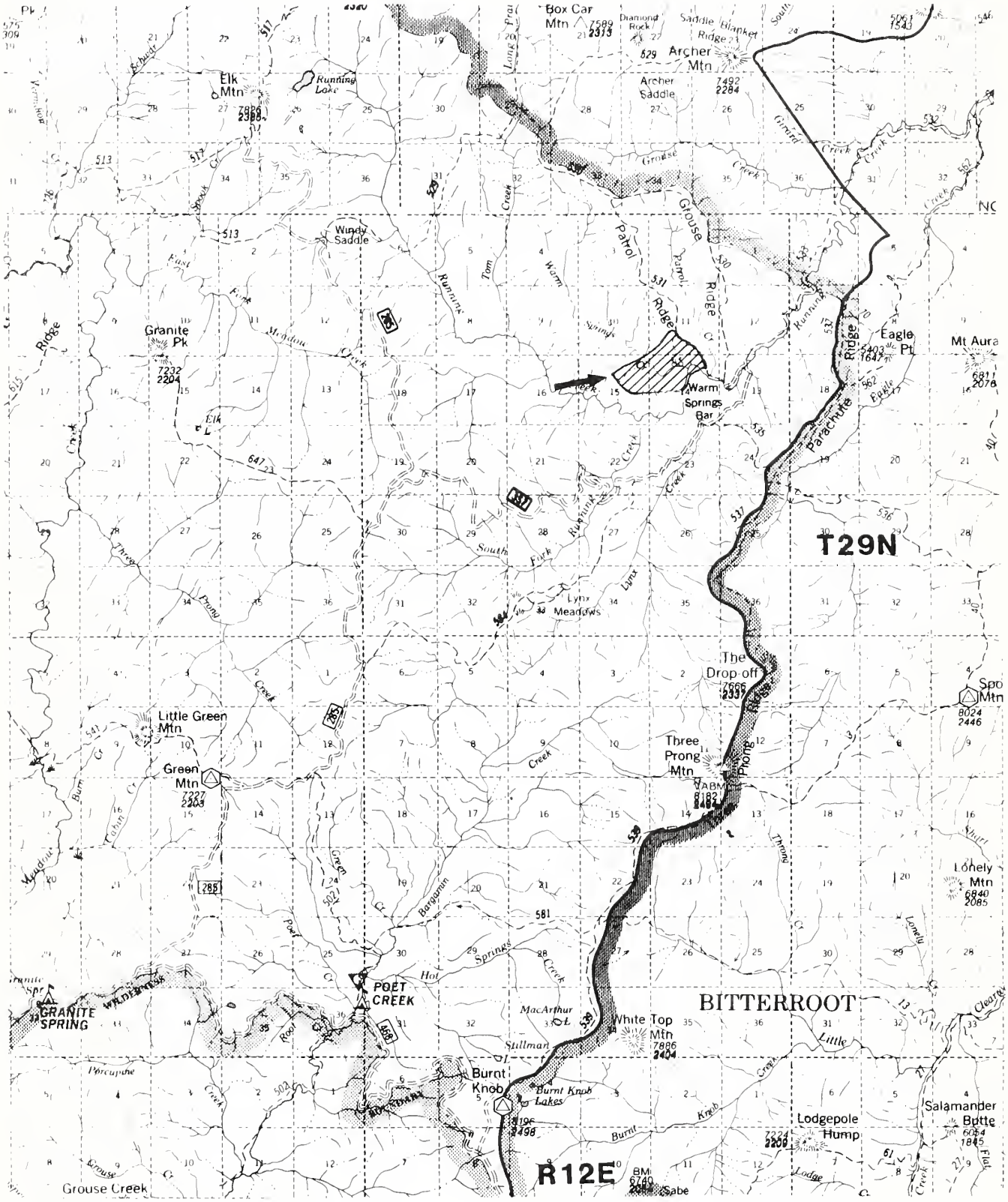
Alluvial terraces support the following fern species:
Athyrium filix-femina, Dryopteris austriaca, Dryopteris filix-mas, Gymnocarpium dryopteris, Adiantum pedatum, and Polystichum munitum

OC-RNA has an abundance of big game winter range; mammals common in the OC-RNA include:

Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Beaver - Castor canadensis
Black bear - Ursus americanus

Avifauna include:
Ruffed grouse - Bonasa umbellus
S. grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

WARM SPRINGS CREEK PROPOSED RNA



26. WARM SPRINGS CREEK PROPOSED RESEARCH NATURAL AREA

This RNA contains two warm springs in NE ID, at the southern botanical range limits of western redcedar and western larch. Forests are dominated by Douglas-fir, grand fir, and redcedar, with an understory of western yew. The springs have not been seriously disturbed by human, livestock, or wildlife use. In addition, one-third of the RNA supports old growth ponderosa pine.

****

The Warm Springs Ck Research Natural Area (WSC-RNA) occupies 214 ha (530 acres) in mountainous northern ID, at the eastern edge of the Nezperce National Forest. The two springs are located in the ID Batholith; igneous rocks underlie the area. The upper spring is undisturbed; the lower spring has been slightly disturbed by the construction (rock rearrangement) of a bathing pool. In the vicinity of WSC-RNA, redcedar and western larch reach their southern range limits in ID. Opportunities exist to study the stability of tree populations at their range limits.

Past fires have perpetuated a population of old growth ponderosa pine. Other forests are dominated by Douglas-fir, grand fir, and redcedar. Beneath these canopies a well developed layer exists of western (Pacific) yew.

The elevations range from 1192 m (3910') where Running Ck flows from WSC-RNA, up to a unnamed point at 1622 m (5320') at the northern end of the RNA. The WSC-RNA is located on the Red River District of the Nezperce National Forest, Idaho Co., ID: 45° 51' N. lat., 114° 46' W. long. The area is mapped within the Three Prong Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The WSC-RNA is at the eastern edge of the Nezperce National Forest, near the Selway-Bitterroot Wilderness. From Grangeville, ID on Hwy # 95, take State Hwy # 14 for 97 km (60 miles) east to within 4 km (2.5 miles) from Elk City, ID. Take FR # 222 for 26 km (16 miles) to Red River Ranger Station; then on FR # 285 north 16 km (10 miles) to juncture with FR # 357; take this latter road east 19 km (12 miles) to Warm Springs Bar (road end). Take Trail # 531 0.6 km (.4 mile) to western boundary of WSC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

WSC-RNA encompasses a narrow V-shaped valley, with adjacent slopes moderate to steep. elevations range from 1192 m (3910') up to 1622 m (5320'); it is located within the ID Batholith.

There are no established weather stations near this RNA; the closest is at Elk City, 37 km (23 miles) west. Mean annual precipitation at Elk City is 76 cm (30"), with a pronounced summer dry period (July-Aug.: 3-4 cm [1.5"] each). Midsummer temperatures average about 16°C (60° F); midwinter (Jan.) averages -6° C (21° F). Mean annual temperature is 5° C (41° F).

ECOLOGIC VALUES

The following forest habitat types are found in the WSC-RNA:

Psme/Agsp	ht	[10 ha/25 acres]
Psme/Feid	ht	[22 ha/55 acres]
Psme/Caru	ht	[10 ha/25 acres]
Psme/Spbe	ht	[22 ha/55 acres]
Abgr/Xete	ht	[22 ha/55 acres]
Abgr/Spbe	ht	[22 ha/55 acres]
Abgr/Phma	ht	[22 ha/55 acres]
Abgr/Clun	ht	[23 ha/55 acres]
Abgr/Libo	ht	[10 ha/25 acres]
Abgr/Asca	ht	[30 ha/75 acres]
Abgr/Setr	ht	[10 ha/25 acres]
Thpl/Clun	ht	[10 ha/25 acres]

The SAF Forest Cover Types:

210: Douglas-fir	[58 ha/145 acres]
213: Grand fir	[73 ha/180 acres]
228: W. redcedar	[10 ha/ 25 acres]
237: Ponderosa pine	[73 ha/180 acres]

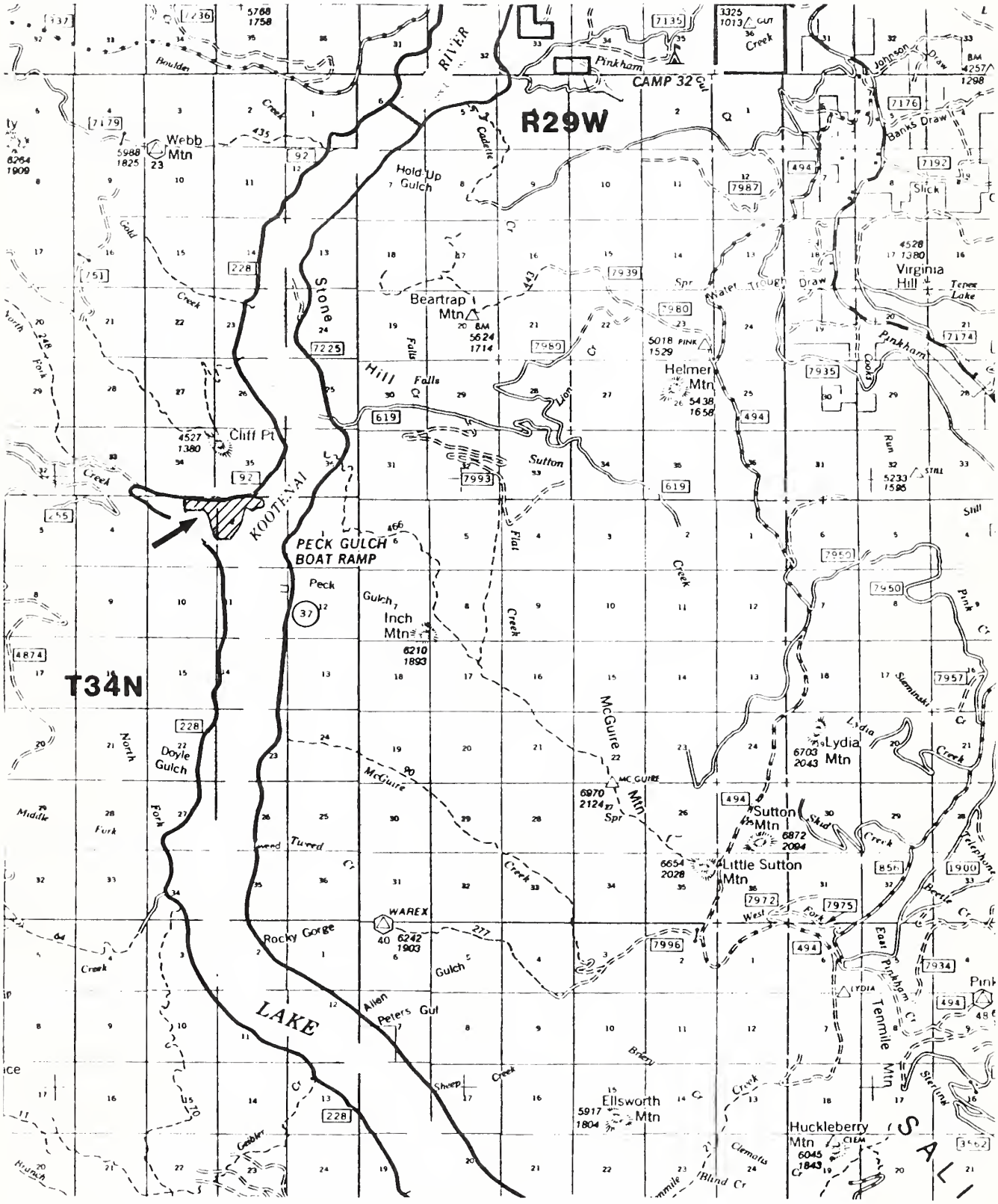
Major shrub species include: Acer glabrum, Amelanchier alnifolia, Ceanothus velutinus, Holodiscus discolor, Philadelphus lewisii, Lonicera utahensis, Cornus stolonifera, Rosa gymnocarpa, Rubus parviflorus, Sorbus scopulina, Berberis repens, Vaccinium globulare, and Spiraea betulifolia.

Common herbaceous species are: Pseudoroegneria spicata, Festuca idahoensis, Calamagrostis rubescens, Carex geyeri, Achillea millefolium, Adenocaulon bicolor, Anemone piperi, Arnica cordifolia, Asarum caudatum, Balsamorhiza sagittata, Clarkia pulchella, Clintonia uniflora, Gymnocarpium dryopteris, Mitella stauropetala, Pyrola secunda, Smilacina stellata, Tiarella trifoliata, and Xerophyllum tenax.

Mammals common in the WSC-RNA include:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Moose - Alces alces
Porcupine - Erethizon dorsatum
Bobcat - Lynx rufus
Mtn. lion - Felis concolor
Beaver - Castor canadensis
Black bear - Ursus americanus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

BIG CREEK PROPOSED RNA



27. BIG CREEK PROPOSED

RESEARCH NATURAL

AREA

This natural area features old growth forest dominated by western larch, ponderosa pine and Douglas-fir which make up the area's forest cover. These cover types were maintained by period fire, and it is intended that fire continue to be employed by prescription in this RNA. Some western redcedar forest is also present on moist microsites.

****

The Big Ck Research Natural Area (BC-RNA) occupies about 130 ha (320 acres) of the Upper Big Ck Riparian Ecosystem located on the Kootenai River (Lake Koocanusa) in NW MT. The vegetation is dominated by fire-generated old growth western larch, ponderosa pine, and Douglas-fir. The larches and pines are estimated to be 350-400 years old with diameters up to 75 cm (30").

Other conifers present include subalpine fir, Engelmann spruce, lodgepole pine, and western white pine. Extensive fires swept through the general area in 1910 and 1919. The area has been subject to detailed sampling and inventory as a part of a plan to employ prescribed fire in this RNA. BC-RNA is a part of a larger (1300 ha/3200 acre) "special interest" management area (the Upper Big Ck Riparian Ecosystem) which has been described in separate reports.

Big Creek RNA is located on the Rexford District of the Kootenai National Forest, Lincoln Co., MT: 48° 45' N. lat., 115° 15' W. long. BC-RNA is mapped on the USGS Inch Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The BC-RNA may be reached from Libby, MT by travelling north on Hwy # 228, an all-weather road that follows the west shore of Lake Koocanusa directly to BC-RNA. This road forms the north boundary and provides access to all sides of the area. Camping is available nearby.

PHYSICAL AND CLIMATIC CONDITIONS

The BC-RNA occupies a low elevation, riparian site adjacent to the former Kootenai River, and now contiguous with the Libby Dam's impoundment, Lake Koocanusa. The lake elevation at this point is 680 m (2243'); the highest point in BC-RNA is 794 m (2620'). River terraces are composed of deep silt loam lacustrine deposits, easily eroded. Some sites exhibit glacial till overlain with loess deposits.

There are no nearby climate stations, however at Libby, MT to the south, Jan. temperatures average -5° C (22° F), while the July average is 19° C (66° F); average annual precipitation at Libby is about 50 cm (20"), with a pronounced dry period in midsummer.

ECOLOGIC VALUES

The following forest habitat types are found in the BC-RNA:

Psme/Vaca	ht	[39 ha/96 acres]
Psme/Vagl	ht	[26 ha/64 acres]
Psme/Libo	ht	[19 ha/48 acres]
Psme/Caru	ht	[19 ha/48 acres]
Psme/Syal	ht	[13 ha/32 acres]
Thpl/Clun	ht	[13 ha/32 acres]

SAF Forest Cover Types Include:

210: D.-fir/Larch	[61 ha/150 acres]
237: Ponderosa pine	[61 ha/150 acres]
228: W. Redcedar	[8 ha/ 20 acres]

Common shrub species include: Acer glabrum, Arctostaphylos uva-ursi, Purshia tridentata, Cornus stolonifera, Lonicera utahensis, Ribes lacustre, Rubus parviflorus, Berberis repens, Pachistima myrsinites, Symphoricarpos albus, Rosa gymnocarpa, Amelanchier alnifolia, Spiraea betulifolia, and Ceanothus velutinus.

Common herbaceous species include Arnica latifolia, Clintonia uniflora, Calamagrostis rubescens, Galium triflorum, Goodyera oblongifolia, Pyrola asarifolia, Vaccinium globulare, Viola orbiculata, Chimaphila umbellata, Pteridium aquilinum, Osmorhiza chilensis, Fragaria virginiana, Pseudoroegneria spicata, Festuca scabrella and Pterospora andromeda.

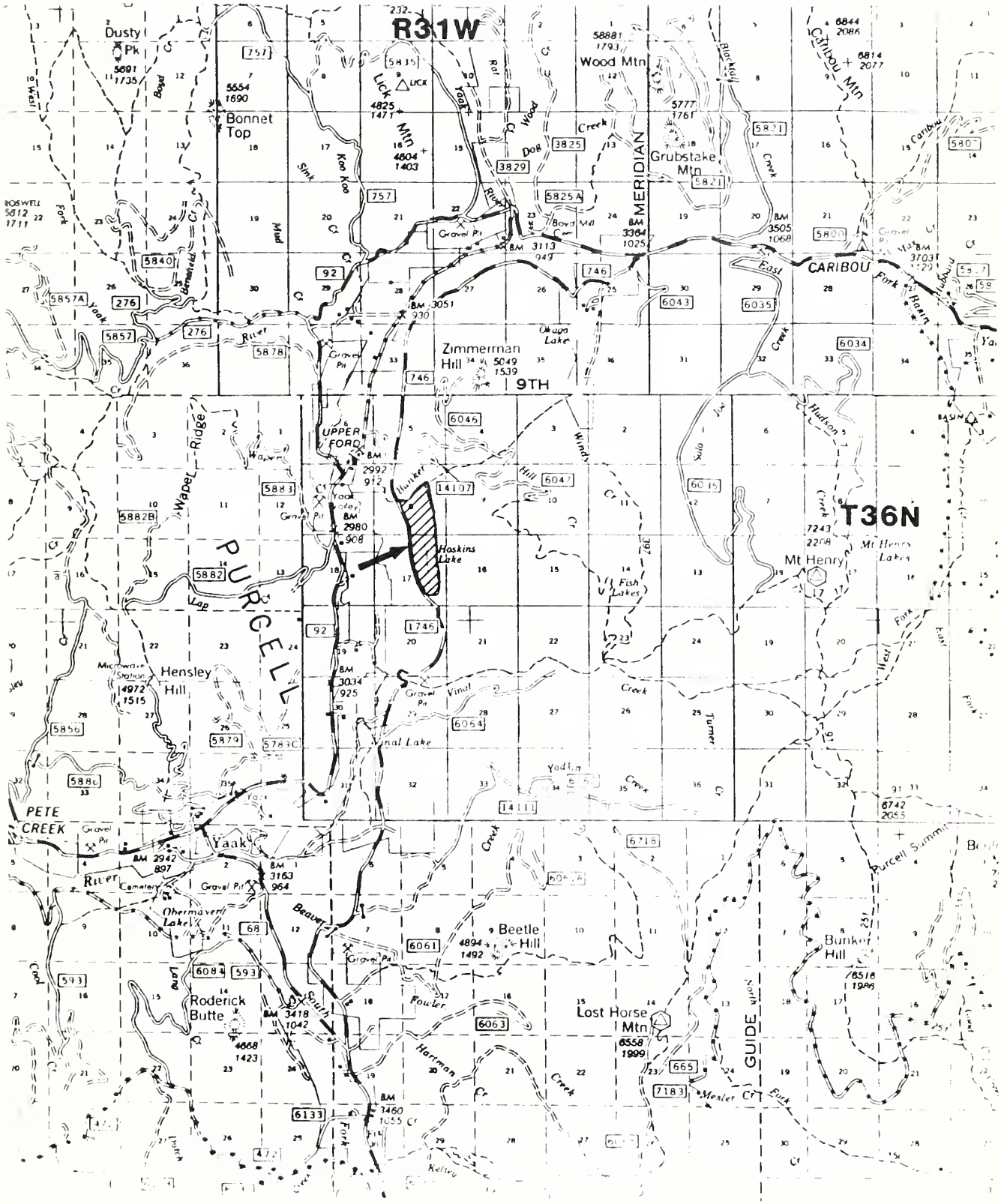
Mammals believed to use the BC-RNA include:

Moose - Alces alces
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Birds include:

Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites candensis
Blue grouse - Dendragapus obscurus

HOSKINS LAKE PROPOSED RNA



28. HOSKINS LAKE PROPOSED

RESEARCH NATURAL

AREA

This natural area features a population of mature Douglas-fir and western larch, with two interconnecting lakes surrounded by marshland. The fringing wetlands support alder, willow, and river birch stands. The lakes have a variety of aquatic macrophytes. The site serves as winter range for mule and white-tailed deer; osprey nest on this site.

****

The Hoskins Lake Research Natural Area (HL-RNA) occupies 182 ha (450 acres) on the East Fork Yaak Planning Unit, 57 km (34 miles) north of Libby, MT. Eighty percent of the total area is covered with mature (1 m/3' dbh) Douglas-fir and western larch. Other conifers include: grand fir, western white pine and lodgepole pine. The remaining 20% is aquatic: two lakes, 15 ha (37 acres) and 4 ha (9 acres) in size. The lakes are linked and surrounded by about 11 ha (27 acres) of marshland vegetation.

Some parts (15%) of HL-RNA, away from the lakes, have been clearcut (1969) but the remainder is natural. The entire area is classified as winter range for deer (Odocoileus hemionus and O. virginianus). The larger of the two lakes has been stocked with westslope cutthroat trout (Salmo clarkii lewisii). Osprey (Pandion haliaetus) frequent the area, with one known active nest within 0.5 km (0.5 miles) of the lakes. The marshlands include a fringe of Sitka alder, water birch, Rocky Mtn maple, and willows.

Hoskins Lake RNA is located on the Three Rivers District of the Kootenai National Forest, Lincoln Co., MT: 48° 52' N. lat., 115° 37' W. long. HL-RNA is mapped on the USGS Bonnet Top Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The HL-RNA may be reached from Libby, MT by travelling north on FR # 68 (South Fork Yaak-Piper Ck Rd) 57 km (34 miles), then 13 km (8 miles) on FR # 746 (Vinal Lake Rd), then 400 meters on Trail # 162 to Hoskins Lake; the trail parallels the length of the lake. Several undeveloped campsites exist along the lake/trail system.

PHYSICAL AND CLIMATIC CONDITIONS

The west boundary of HL-RNA is formed by a hog back ridge with outcrops; the highest point in at the north end, 1074 m (3545'). The lake levels are at 1006 m (3320'). The east-facing slope overlooking the lake has numerous rock outcroppings.

There are no nearby climate stations, however at Libby, MT to the south, Jan. temperatures average -5° C (22° F), while the July average is 19° C (66° F); average annual precipitation at Libby is about 50 cm (20"), with a pronounced dry period in midsummer.

ECOLOGIC VALUES

The following forest habitat types and other units are found in the HL-RNA. The area each occupies is approximately 20 ha (50 acres):

Tshe/Clun ht
Thpl/Clun ht
Picea/Clun ht
Picea/Vaca ht
Psme/Syal ht
Psme/Caru ht
Wet Meadow
Clear cut

SAF Forest Cover Types include:
210: Douglas-fir
224: Western hemlock
228: Western redcedar
213: Grand fir
206: Spruce-fir
218: Lodgepole pine

Common shrub species include:
Acer glabrum, Alnus sinuata, Cornus stolonifera, Lonicera utahensis, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Berberis repens, Pachistima myrsinites, Symphoricarpos albus, Rosa gymnocarpa, Amelanchier alnifolia, Spiraea betulifolia, and Prunus virginiana.

Common herbaceous species include

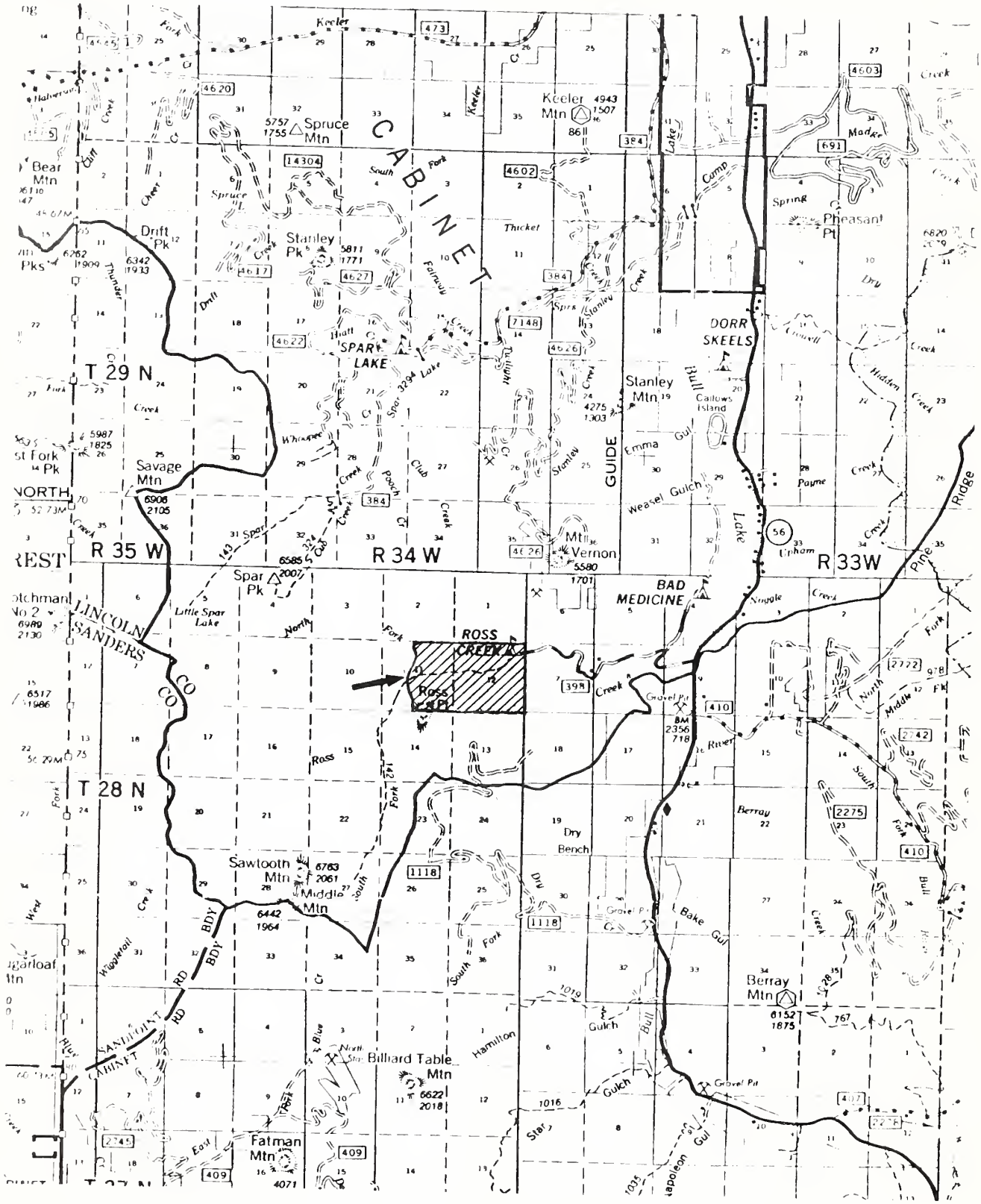
Athyrium filix-femina, Arnica latifolia, Clintonia uniflora, Gymnocarpium dryopteris, Lycopodium spp., Equisetum arvense, Galium triflorum, Goodyera oblongifolia, Adenocaulon bicolor, Aralia nudicaulis, Pyrola asarifolia, Vaccinium globulare, Viola orbiculata, Chimaphila umbellata, Pteridium aquilinum, Aralia nudicaulis, Osmorhiza chilensis, Linnaea borealis, and Fragaria virginiana

Aquatic plant include species of the following genera:
Nuphar, Ceratophyllum, Sparganium, Angelica, Mentha and Carex.

Mammals using the BMSA-RNA include:
Moose - Alces alces
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
Osprey - Pandion haliaetus

LOWER ROSS CREEK PROPOSED RNA



29. LOWER ROSS CREEK PROPOSED

RESEARCH NATURAL

AREA

This natural area features a population of mature western redcedar occupying low elevation, streamside terraces in northwestern Montana. The main cedar grove is protected as the Ross Creek Giant Cedars Scenic Area; the RNA surrounds this grove and includes a variety of associated conifer forests, on bottomland and adjacent upland slopes.

****

The Lower Ross Ck Research Natural Area (LRC-RNA) occupies 340 ha (839 acres) of streamside terraces and contiguous slopes in a steep-sided canyon in the western Cabinet Mtns. in NW MT. The Giant Cedars Scenic Area, surrounded by the LRC-RNA, covers another 48 ha (120 acres). Both mature (old-growth) western redcedar and post-fire (1910 & earlier) generation stands are also present. On adjacent slopes western hemlock, western larch, and lodgepole pine form a variety of upland seral and climax forest types. Engelmann spruce and Douglas-fir are also present.

The lowest point in LRC-RNA is at 860 m (2840'), and the highest site, Ross Point, is 1358 m (4480') The moist, narrow canyon has experienced only a few high intensity fires in recent centuries; isolated charred stumps and snags suggest past non-spreading lightning fires within the ancient cedar groves. The western white pine is infected with Cronartium ribicola. The LRC-RNA is located in the Troy District, Kootenai National Forest, Lincoln Co., MT: 48° 12' N. lat., 115° 55' W. long. The area is mapped within the USGS Sawtooth Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The LRC-RNA may be reached from Troy, MT (Hwy # 2) or Noxon, MT, (Hwy # 200) via State Hwy # 56 which passes near the Scenic Area entrance. A paved road leads directly to the Giant Cedars Area. Access to the LRC-RNA is by Trail # 142 which traverses the grove and beyond along Ross Ck to the western boundary. Overnight camping exists nearby at Bad Medicine Campground.

PHYSICAL AND CLIMATIC CONDITIONS

The LRC-RNA setting is geologically complex; ancient mountain building formed the main features that later were affected by glacial and water erosion. The site is believed to have been flooded by Glacial Lake Missoula. The climate is dominated by Pacific maritime moisture that penetrates into this part of MT, and much of western Lincoln Co. receives abundant winter moisture, 100 cm (40") or more.

At Troy, MT, the nearest weather station, Jan temperatures average -6° C (21° F), while the July average is 18° C (64° F); average annual temperate is 6° C (43° F). The average length of growth season at Troy is 104 days.

ECOLOGIC VALUES

The following forest habitat types are found in the LRC-RNA:

Tshe/Clun	ht	[198 ha/488 acres]
Tshe/Opho	ht	[60 ha/150 acres]
Thpl/Clun	ht	[18 ha/ 44 acres]
Psme/Phma	ht	[23 ha/ 57 acres]
Abgr/Clun	ht	[8 ha/ 19 acres]
Abla/Mefe	ht	[4 ha/ 10 acres]
Talus/Scree		[29 ha/ 71 acres]

The SAF Forest Cover Types:

212: Larch/Douglas-fir	[269 ha/664 acres]
228: Western redcedar	[44 ha/110 acres]
227: Cedar-hemlock	[" / "
218: Lodgepole pine	[14 ha/ 35 acres]
237: Ponderosa pine	[10 ha/ 25 acres]
206: Spruce-fir	[2 ha/ 5 acres]

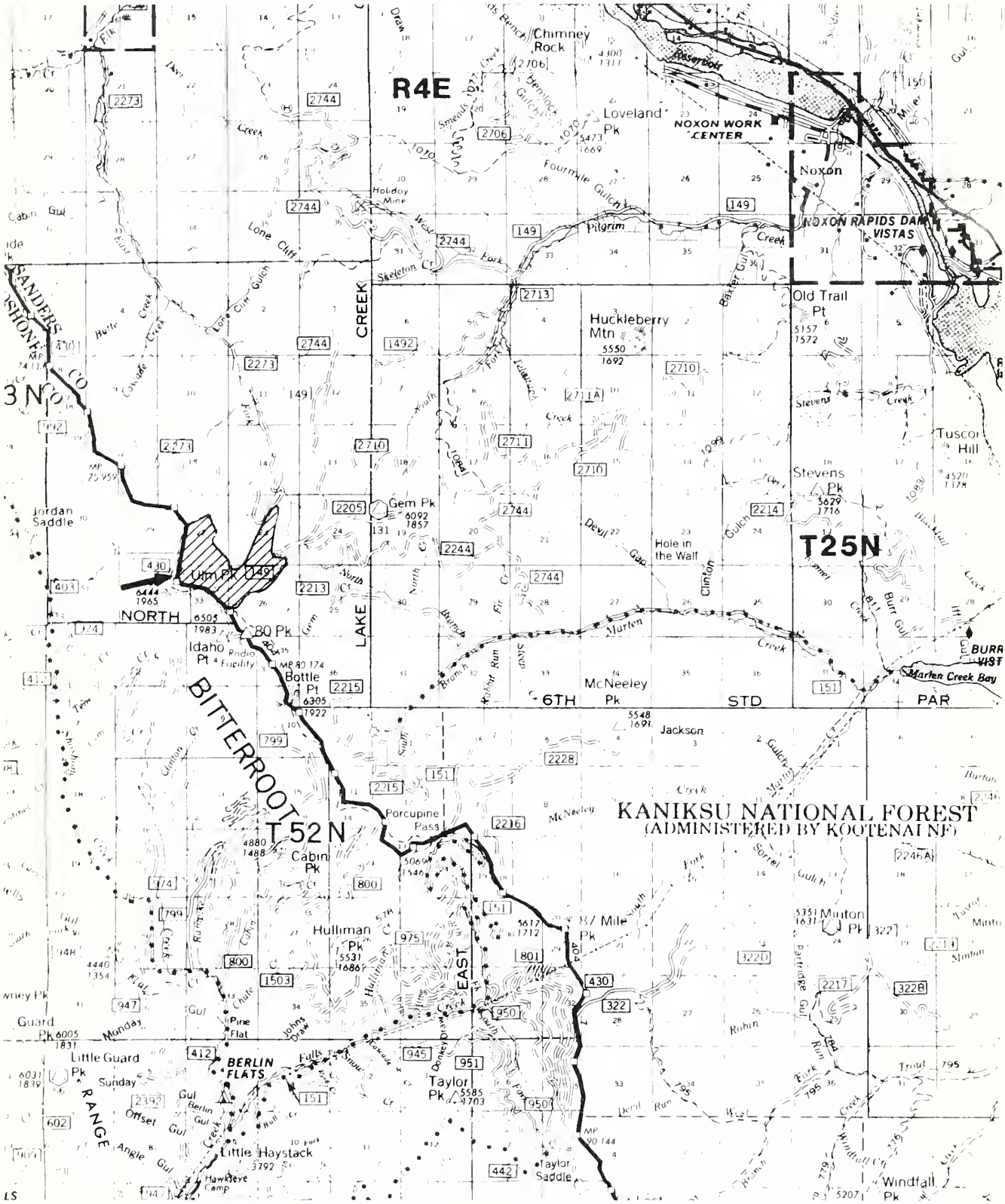
Common shrub species include: Acer glabrum, Alnus sinuata, Oplopanax horridum, Lonicera utahensis, Menziesia ferruginea, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus scopulina, Holodiscus discolor, Rosa gymnocarpa, Taxus brevifolia, Vaccinium globulare, and Sambucus racemosa.

Common herbaceous species include Athyrium filix-femina, Cystopteris fragilis, Botrychium virginianum, Arnica latifolia, Clintonia uniflora, Gymnocarpium dryopteris, Lycopodium spp., Equisetum arvense, Polystichum munitum, Galium triflorum, Goodyera oblongifolia, Adenocaulon bicolor, Mitella stauropetala, Aralia nudicaulis, Pyrola asarifolia, Aconitum columbianum, Actaea rubra, Heracleum lanatum, and Xerophyllum tenax.

Mammals using the BMSA-RNA include:
Grizzly bear - Ursus arctos
Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus

ULM PEAK PROPOSED RNA



30. ULM PEAK PROPOSED

RESEARCH NATURAL

AREA

The forests in this RNA are dominated by mature mountain hemlock, representing an inland maritime occurrence of a conifer dominating Pacific Coastal forests further west, and reaching its eastern limits in western Montana. Both subalpine fir and whitebark pine are common associates, while several montane conifers are also present.

****

The Ulm Peak Research Natural Area (UP-RNA) occupies 275 ha (688 acres) of mountain terrain on the MT/ID stateline in western Montana. Some of the mountain hemlock forests are mature and exhibit open canopies with a dense shrub layer (menziesia); other stands represent earlier stages of succession following fire. The area has steep rocky cliffs and numerous talus slides & rock fields. Common associates include subalpine fir, Engelmann spruce, western larch, whitebark pine, and Douglas-fir. Some western whitepine, up to 90 cm dbh, are also present in the UP-RNA.

Two small lakes occur in cirque basins below Ulm Peak, at 1953 m (6444') on the stateline. The lakes occur at 1697 m (5600'); the lowest point within the UP-RNA is at 1273 m (4200'). The UP-RNA is located within the Cabinet Ranger District, Kootenai National Forest, Sanders Co., MT: 47° 53' N. lat., 115° 57' W. long. The area is mapped within the Gem Peak Quadrangle, (MT/IDA), 7.5' series.

ACCESS AND ACCOMMODATIONS

The UP-RNA may be reached from either the MT or ID sides of the stateline; 4 X 4 pickup trucks serve best. From Noxon, MT, take the Pilgram Ck Rd # 149 to its junction with the North Branch Marten Ck Rd # 2213 near the NE corner of the RNA. This latter track leads directly to the stateline and beyond (into ID), making all parts of the UP-RNA easily acceptable. Truck or tent camping is possible in the near vicinity.

PHYSICAL AND CLIMATIC CONDITIONS

The UP-RNA has steep cirque headwalls and rocky slopes which make travel on foot difficult. The terrain adjacent to the developed roads has gentle topography however. Springs and other seeps originate from several of the rock slides.

The climate is dominated by Pacific maritime weather; moist air masses penetrate into this part of MT, and much of western Sanders Co. receives abundant winter moisture, 140-190 cm (55-75").

The UP-RNA is a part of the Coeur d'Alene Range, and composed of Precambrian sedimentary rocks (500-1500 million years old). Mudstones exhibit mudcracks, ripple marks, and raindrop impressions. Local mountain glaciation during the Pleistocene scoured out the cirque basins now occupied by the two small lakes.

ECOLOGIC VALUES

The following forest habitat types are found in the UP-RNA:

Tsme/Mefe & Luhi	ht	[178 ha/440 acres]
Tsme/Xete	ht	[61 ha/150 acres]
Tshe/Clun	ht	[20 ha/ 50 acres]
Cliffs & Rockland		[14 ha/ 35 acres]
Lakes		[2 ha/ 5 acres]

The SAF Forest Cover Types:

205 Mountain hemlock	[245 ha/605 acres]
224 Western hemlock	[14 ha/ 35 acres]

The major shrub species are: Amelanchier alnifolia, Berberis repens, Linnaea borealis, Lonicera utahensis, Menziesia ferruginea, Pachistima myrsinites, Ribes lacustre, Rubus parviflorus, Sorbus sitchensis, S. scopulina, Spiraea betulifolia, Taxus brevifolia, Vaccinium globulare, and V. scoparium.

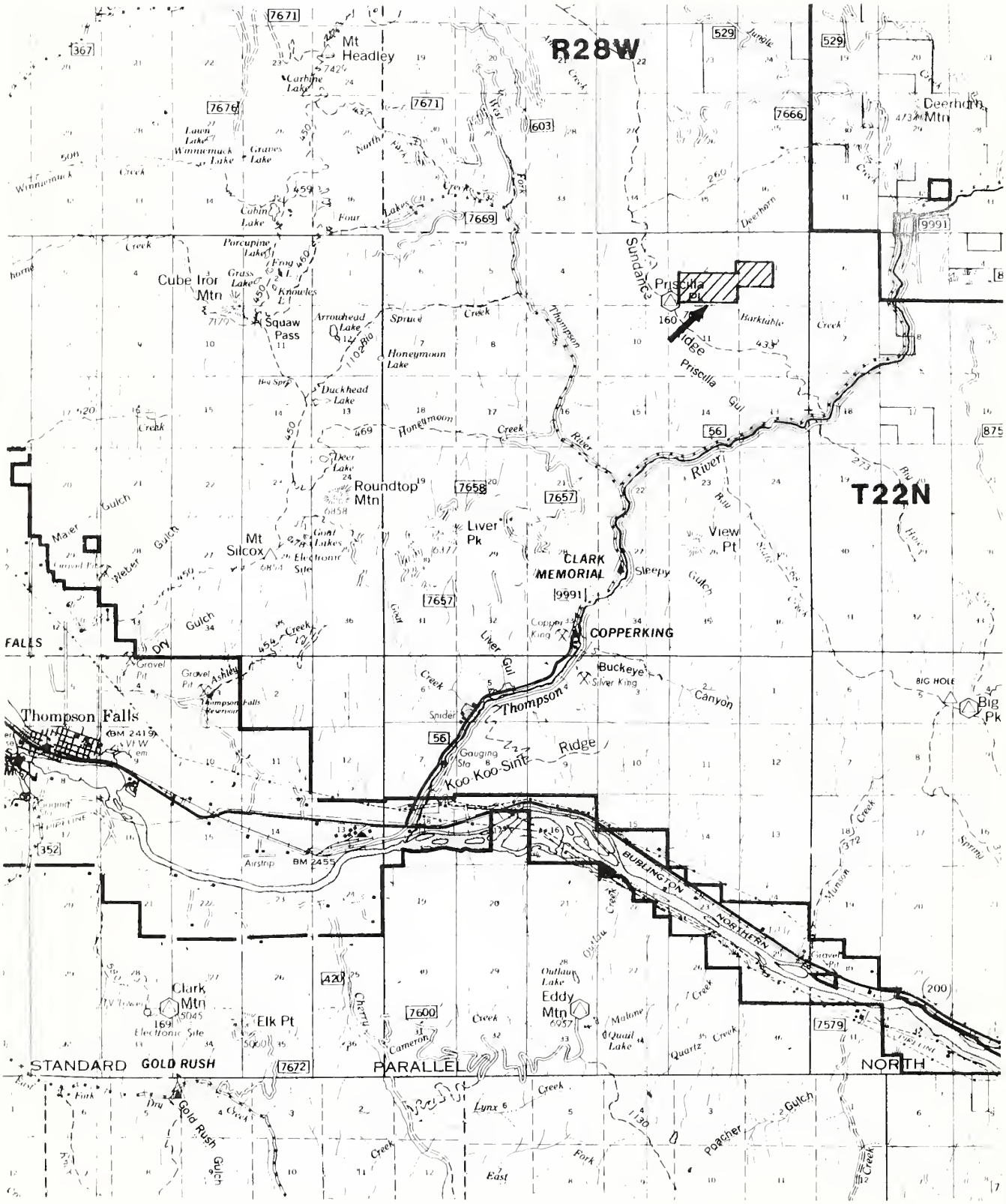
Common herbaceous species include: Achillea millefolium, Agoseris auranticus, Aquilegia flavescens, Arnica latifolia, Clintonia uniflora, Epilobium alpinum, Erigeron acris, Festuca viridula, Galium triflorum, Goodyera oblongifolia, Luzula hitchcockii, Mitella breweri, Oxyria digyna, Pyrola secunda, Sedum lanceolatum, Tiarella trifoliata, and Xerophyllum tenax.

Mammals using the BMSA-RNA include:

Moose - Alces alces
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Marten - Martes americana
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
C. nutcracker - Nucifraga columbiana

BARKTABLE RIDGE PROPOSED RNA



31. BARKTABLE RIDGE PROPOSED

RESEARCH NATURAL

AREA

This RNA features inland maritime communities of mature mountain hemlock occupying a 126 ha (312 acres), nearly level plateau at 1725 m (5700') in western MT. Other montane and subalpine zone conifers are also present, including lodgepole pine.

****

The Barktable Ridge Research Natural Area (BR-RNA) was established in 1986, and features an eastern extension of mountain hemlock into the northern Rockies. A portion of the BR-RNA supports old-growth mountain hemlock that has remained free of fire for the past three centuries, although stand replacement fire has altered surrounding forests. Associated conifers include western larch, ponderosa pine, western white pine, whitebark pine, Douglas-fir, lodgepole pine, subalpine fir, and Engelmann spruce.

BR-RNA is located on the Thompson Falls-Plains District, Lolo National Forest, Sanders Co., MT: 47° 40' N. lat., 115° 10' W. long. It is mapped within the USGS Priscilla Peak Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

BR-RNA is located NE of Thompson Falls, MT, and is reached by road or trail systems originating from the Thompson River Rd # 56. The Priscilla Peak Trail # 433 ascends to the western end of Barktable Ridge. The Deerhorn Ck Rd # 7666 also reaches the boundary of BR-RNA. This road serves to delineate this natural area. Developed campsites do not exist near the BR-RNA; the nearest are on the Thompson River Rd.

PHYSICAL AND CLIMATIC CONDITIONS

BR-RNA is located in the SE portion of the Cabinet Mtns. Peaks reach elevations up to 2100 m (7000'). Much of the terrain is steep, however Barktable Ridge is a flat plateau. The nearest climate station, Thompson Falls, MT (733 m/2419'), has a mean annual precipitation of 50 cm (20"), but the BR-RNA is believed to receive at least twice this amount, much in the form of winter snow. Mountain hemlock in western MT occurs in areas where snowfall is high (maritime influence), but not subject to the temperature extremes of continental winters.

The BR-RNA exists in a region of high angle faults ("Montana Disturbed Belt"). Bedrock types include Precambrian Belt rocks composed of argillites and quartzites. Glacial action has scoured the landscape and carved cirques.

ECOLOGIC VALUES

The BR-RNA supports the following habitat types:

Tsme/Xete	ht	[73 ha/181 acres]
Tsme/Mefe	ht	[15 ha/ 38 acres]
Abla/Xete	ht	[6 ha/ 14 acres]
Abla/Clun	ht	[9 ha/ 22 acres]
Abgr/Xete	ht	[23 ha/ 57 acres]

SAF Cover Types are as follows:

205: Mtn hemlock	[43 ha/106 acres]
206: Spruce-fir	[5 ha/ 11 acres]
210: Douglas-fir	[6 ha/ 15 acres]
213: Grand fir	[39 ha/ 97 acres]
218: Lodgepole	[34 ha/ 83 acres]

Major shrub species are:

Vaccinium globulare, V. scoparium, Lonicera utahensis, Menziesia ferruginea, Pachistima myrsinites, Spiraea betulifolia, and Ribes viscosissimum.

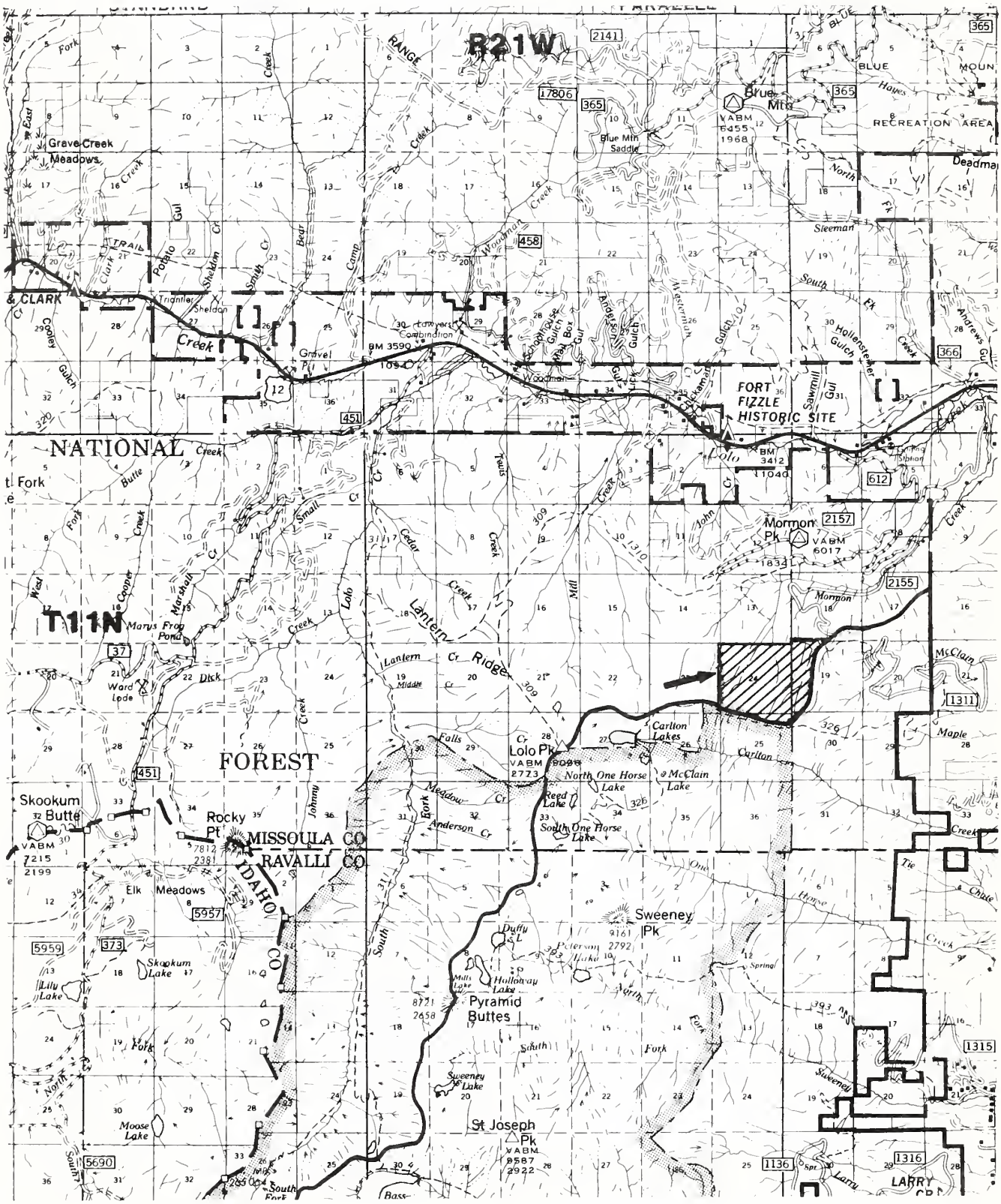
Herbaceous species dominating the understories include:
Arnica latifolia, Clintonia uniflora, Pyrola secunda, P. asarifolia, Chimaphila umbellata, Xerophyllum tenax, Pedicularis racemosa, Hieracium cynoglossoides, and Carex geyeri.

A systematic inventory of the fauna occupying the area that includes BR-RNA has not been made. Other wildlife resource studies suggest the presence of:

Mammals:
Grizzly bear - Ursus arctos
Black bear - U. americanus
Bighorn sheep - Oreamnos americanus
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Mountain lion - Felis concolor
Lynx - Lynx canadensis
Coyote - Canis latrans
Snowshoe hare - Lepus americanus
N. flying squirrel - Glaucomys sabrinus

Birds:
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Mtn. bluebird - Sialia currucoides
C. nutcracker - Nucifraga columbiana
P. woodpecker - Dryocopus pileatus

CABLTON RIDGE RNA



32. CARLTON RIDGE

RESEARCH NATURAL

AREA

This RNA encompasses an upper subalpine zone between 1700 to 2500 m (5600-8200') featuring parklike groves of alpine larch and whitebark pine at the upper elevations, and spruce-fir forests at lower sites. The upper limits of western larch are exhibited and a zone of overlap between the two larch species is present within this RNA. Carlton Ridge is a part of the Idaho Batholith.

****

The Carlton Ridge Research Natural Area (CR-RNA) was established in 1987 and represents an upper elevational segment that features a number of subalpine forest types. Most notable among these are open, parklike stands dominated by alpine larch, with some whitebark pine present. These alpine larch communities are unusual for the northern Rockies because they exist on deep soils rather than on the coarse rocky substrates this larch usually occupies.

Western larch reaches its upper limits at 1800 m (6000') and overlaps with alpine larch; a zone of hybridization exists within the CR-RNA boundaries. Also within the limits of the CR-RNA there are forests dominated by subalpine fir, Engelmann spruce, and lodgepole pine. Although not above timberline, ribbon forest and snow glade patterns are exhibited.

CR-RNA occupies 372 ha (920 acres) and is located on the Missoula District of the Lolo National Forest, Missoula, Co., MT; 46° 40' N. lat., 114° 10' W. long. It is mapped within the Carlton Lake Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The southern (upper) boundary of the CR-RNA coincides with a jeep trail (Carlton Lake Trail) that may be reached from Hwy # 93 at a point 10 km (6 miles) south of Lolo, MT. Forest access roads penetrate to the west and allow approach to this jeep trail or to other east boundary points. The Morman Pk road allows access from Hwy # 12; this leads to foot trails that penetrate areas near the north and west boundaries of the CR-RNA. The southern RNA border is contiguous with the Selway Bitterroot Wilderness.

PHYSICAL AND CLIMATIC CONDITIONS

It is estimated that precipitation within CR-RNA varies from 88 cm (35") at the lower elevations to 113 cm (45") on Carlton Ridge itself. Much of the annual precipitation comes as snow between September and May, with dry summers; snow drifts vary from 1-3 m (3-10'). Mean July temperature is about 15 C (60° F); January: about -9° C (15° F).

CR-RNA lies at the northern end of the Bitterroot Mountains, a granitic fault block related to the ID Batholith. Rocks are schist and gneiss. The main ridge is covered with a deep mantle of weathered (frost churned) soil that is very well drained (brown podzolic). Past alpine glacial action has also operated on this site. Soils are classed as grusstic and micaceous.

ECOLOGIC VALUES

The CR-RNA has the following habitat types:

Abla/Luhi	ht	[149 ha/368 acres]
Abla/Mefe	ht	[130 ha/322 acres]
Abla/Xete	ht	[37 ha/ 92 acres]
Laly/Abla	ht	[37 ha/ 92 acres]
Abla/Clun	ht	[11 ha/ 28 acres]
Pial/Abla	ht	[7 ha/ 18 acres]

SAF Cover Types are:

206:	Spruce-fir	[148 ha/368 acres]
208-A:	Alpine larch	[56 ha/138 acres]
208-B:	Whitebark pine	[74 ha/184 acres]
218:	Lodgepole pine	[93 ha/230 acres]

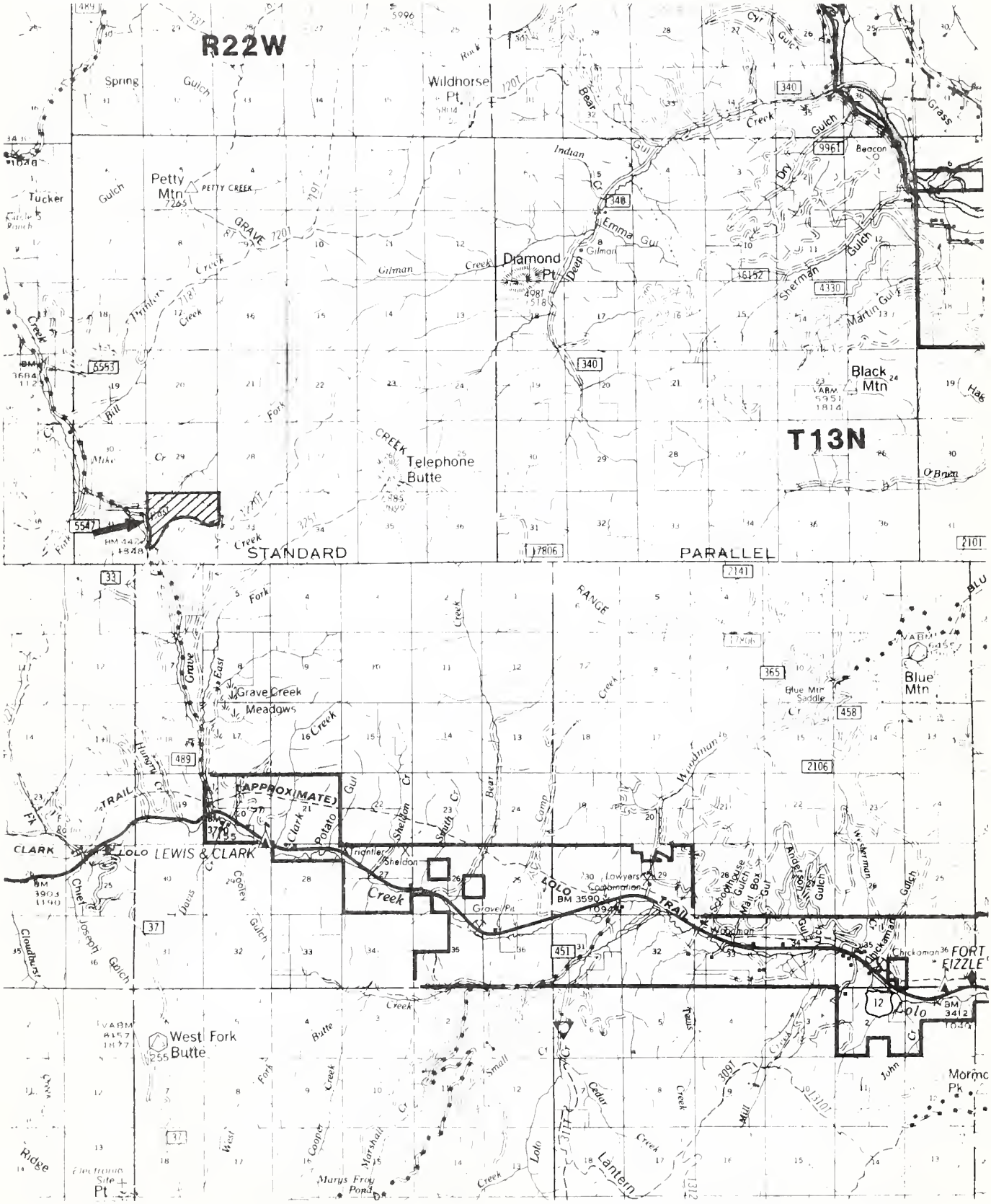
Major groundlayer species include:
Shrubs: Phyllodoce empetriformis, Vaccinium scoparium, V. globulare, Acer glabrum, Cassiope mertensiana, and Menziesia ferruginea.

Forbs: Luzula hitchcocki, Xerophyllum tenax, Calamagrostis rubescens, Saxifraga bronchialis, Athyrium filix-femina, Galium triflorum, and Linnaea borealis.

Mammals using the CR-RNA:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Marten - Martes americana
Fisher - M. pennanti
Red squirrel - Tamiasciurus hudsonicus
H. marmot - Marmota caligata

Avifauna present in CR-RNA:
C. nutcracker - Nucifraga columbiana
Common raven - Corvus corax
P. woodpecker - Dryocopus pileatus
Blue grouse - Dendragapus obscurus
Ruffed grouse - Bonasa umbellatus
Mtn chickadee - Parus gambeli
Mtn bluebird - Sialia currucoides

PETTY CREEK RNA



33. PETTY CREEK

RESEARCH NATURAL AREA

This RNA consists of a mixture of Douglas-fir, western larch, grand fir and lodgepole pine, occupying 125 ha (310 acres) and ranging between 1200 and 1500 m (3960-4950') elevation. Some timber is old growth although past fires have generated lodgepole-dominated stands on a third of the site.

****

The Petty Ck Research Natural Area (PC-RNA) was established in 1987 and represents montane forest in western MT. The 125 ha (310 acres) site supports a diversity of Douglas-fir, grand fir, western larch, and lodgepole pine forests, together with lesser quantities of several other conifers. The natural area is located on the Ninemile Ranger District, Lolo National Forest, Missoula Co., MT: 46° 50' N. lat., 114° 50' W. long. It is included within the USGS Garden Point Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

PC-RNA is reached by travelling south from Missoula on Hwy # 93 to Lolo, MT, and from there west on Hwy # 12 to the Graves Ck Rd # 489; travel north on # 489 8 km reaching the Petty Ck-Graves Ck Divide Rd # 17436 which serves as the southern boundary of PC-RNA. Camping accommodations are nearby in the Lewis and Clark Campground on Hwy # 12. Access roads at or near the PC-RNA boundaries permit travel into potential study sites. Old, abandoned logging roads facilitate foot travel through other parts of PC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

The PC-RNA is located amidst the northern Bitterroot Mtns. Although the west slope of the Bitterroots in nearby northern ID intercept much of the moisture originating in Pacific storm systems, the Petty Ck drainage receives an estimated 50-100 cm (20-40") annually. Much of this is often in the form of snow in winter and early spring. The summer months are typically dry, but moisture stress is not believed to be severe. The presence of grand fir habitat types in PC-RNA suggest a maritime influence. There are no weather stations located near PC-RNA.

Precambrian rocks, identified as argillites, siltites and quartzites, dominate PC-RNA. Glacial Lake Missoula clays and gravels form surface deposits. Soils include: (1) typic cryoboralf, (2) udic ustocherpt and (3) typic eutroboralfs.

ECOLOGIC VALUES

The PC-RNA supports the following forest habitat types:

Abgr/Libo ht	[35 ha/85 acre]
Psme/Libo ht	[32 ha/80 acre]
Psme/Vasc ht	[8 ha/70 acre]
Abgr/Clun ht	[14 ha/35 acre]

Current SAF Cover Types present:

218: Lodgepole pine	[53 ha/130 acres]
212: Larch-D.-fir	[32 ha/ 80 acres]
210: Douglas-fir	[12 ha/ 30 acres]
237: Ponderosa pine	[10 ha/ 25 acres]
213: Grand fir	[10 ha/ 25 acres]
206: Spruce-fir	[8 ha/ 20 acres]

The forest types form a mosaic pattern related to local variations in slope and aspect, as well as past fire which has been a major influence in the PC-RNA.

Major shrub species include: Acer glabrum, Amelanchier alnifolia, Holodiscus discolor, Lonicera utahensis, Menziesia ferruginea, Pachistima myrsinites, Philadelphus lewisii, Rosa gymnocarpa, Rubus parvflorus, Spiraea betulifolia, Symphoricarpos albus, Vaccinium globulare, V. scoparium, Berberis repens, and Linnaea borealis.

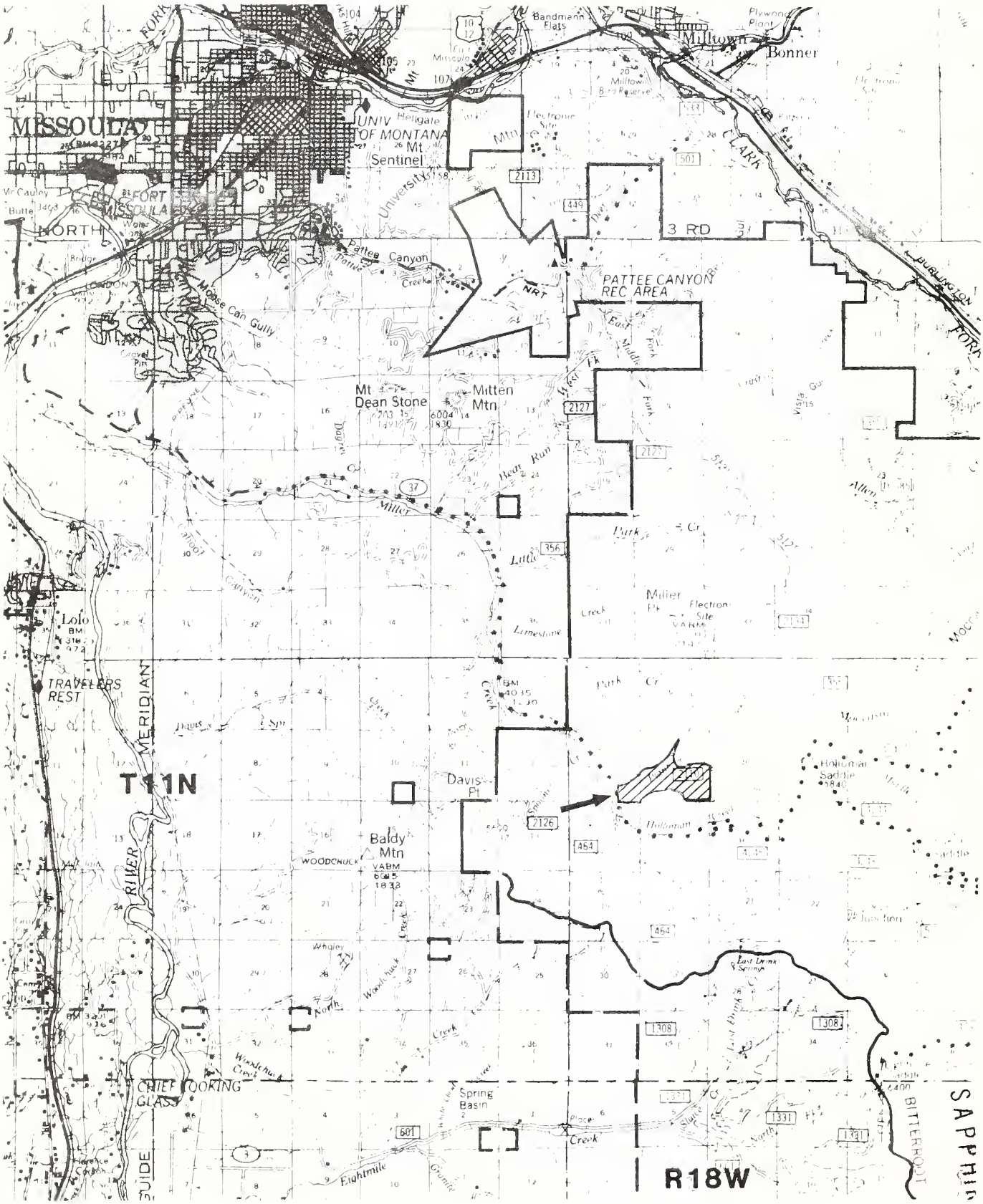
Numerous ferns, graminoids and herbaceous species, typical of moist montane forests on western Montana are also present in the natural area.

Mammals present in PC-RNA include:
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Coyote - Canis latrans
Lynx - Lynx rufus
Red squirrel - Tamiascius hudsonicus
Snowshoe hare - Lepus americanus

Avifauna include:
Ruffed grouse - Bonasa umbellus
Spruce grouse - Canachites canadensis
Blue grouse - Dendragapus obscurus
P. woodpecker - Dryocopus pileatus
D. woodpecker - Dendrocopos pubescens
Common raven - Corvus corax

Streams in and near the Petty Ck natural area support populations of rainbow trout (Salmo gairdneri), eastern brook trout (Salvelinus fontinalis), and a rainbow-cutthroat trout hybrid (Salmo clarki).

PLANT CREEK RNA



34. PLANT CREEK

RESEARCH NATURAL AREA

This RNA is composed of mature 300-year-old western larch and Douglas-fir, with younger fire-generated western larch and lodgepole pine, plus streamside Engelmann spruce, covering 104 ha (205 acres) at about 1500 m (5000'). Past fires have generated a mosaic of successional stages.

****

The Plant Ck Research Natural Area (PC-RNA) was established in 1987 and represents montane zone forest in western Montana. The 104 ha (258 acres) site features 300-year-old growth western larch and Douglas-fir, an uncommon surviving forest type at lower elevations. The PC-RNA also supports younger, fire generated stands of western larch and lodgepole pine , and streambottom Engelmann spruce. A 10 ha (25 acres) logged site is the only modern disturbance.

The PC-RNA is located on the Missoula District of the Lolo National Forest, Missoula Co., MT: 46° 50' N. lat., 113° 53' W. long. It is included within the USGS Cleveland Mountain Quadrangle, 15' series.

ACCESS AND ACCOMMODATIONS

The PC-RNA is reached by travelling SW from Missoula, MT on the Upper Miller Ck Rd originating on the SW edge of the Missoula City limits, southward from Hwy # 93. At a distance of 22 km (13 miles) on the Miller Ck Rd intersect the Plant Ck Rd. The Miller Ck and Plant Ck Rd form the western boundary of PC-RNA. The eastern half is reached by travelling E/NE on Plant Ck Rd, and S/SE on the East Fork Plant Ck Rd # 2110. A pack trail affords access to ridgeline that forms the southern boundary. An undeveloped campsite exists on Miller Ck.

PHYSICAL AND CLIMATIC CONDITIONS

PC-RNA is located in northern portion of the Sapphire Mtns, where the typical mountain relief extends from about 1200m (4000') up to 2100 m (7000'). The lowest point of PC-RNA is about 1250 m (4100'), and the highest about 1725 m (5700'). It is assumed that PC-RNA is cooler and wetter than Missoula (970 m/3200'), the nearest weather station: 37 cm (15") annual precipitation, dry July-August, summmer temperatures average 20° C (68° F). It is estimated that snow depths in PC-RNA reach up to 1 m (3') between Nov. and Mar.

Geology: Precambrian Wallace Formation composed of dolomitic siltstone and sandstone, dolomite and green-gray & red argillites. No evidence PC-RNA was glaciated or inundated by Glacial Lake Missoula. Soils consist if gray wooded soils on dry (lower) sites, and brown podzolics on cooler, wetter (higher) sites.

ECOLOGIC VALUES

The PC-RNA supports the following forest habitat types:

Psme/Phma-Phma	ht	[36 ha/92 acres]
Psme/Phma-Caru	ht	[35 ha/88 acres]
Picea climax	ht	[17 ha/41 acres]
Psme/Libo	ht	[5 ha/13 acres]

The SAF Cover Types are:

206: Englemann spruce	[17 ha/ 42 acres]
210: Douglas-fir	[40 ha/100 acres]
212: Larch-D-fir	[47 ha/117 acres]

Old-growth western larch is the most conspicuous feature in the eastern half of PC-RNA and multiple fire scars on the 200-300 year old larch and Douglas-fir, and occasional ponderosa pine suggest periodic ground fires in the old growth. Elsewhere more intense fire has generated 65-70 year old larch and lodgepole pine stands.

Major shrub species in PC-RNA include: Acer glabrum, Amelanchier alnifolia, Berberis repens, Physocarpus malvaceus, Rubus parviflorus, Rosa gymnocarpa, Spiraea betulifolia, Sambucus racemosa, Symphoricarpos albus, and Vaccinium globulare.

Numerous other ferns, forbs, and graminoids occupy the north-slope and ravine sites; the upper, warm ridgeline sites (S boundary) support the basic elements of Palouse prairie including Pseudoroegneria spicata, Festuca scabrella and F. idahoensis.

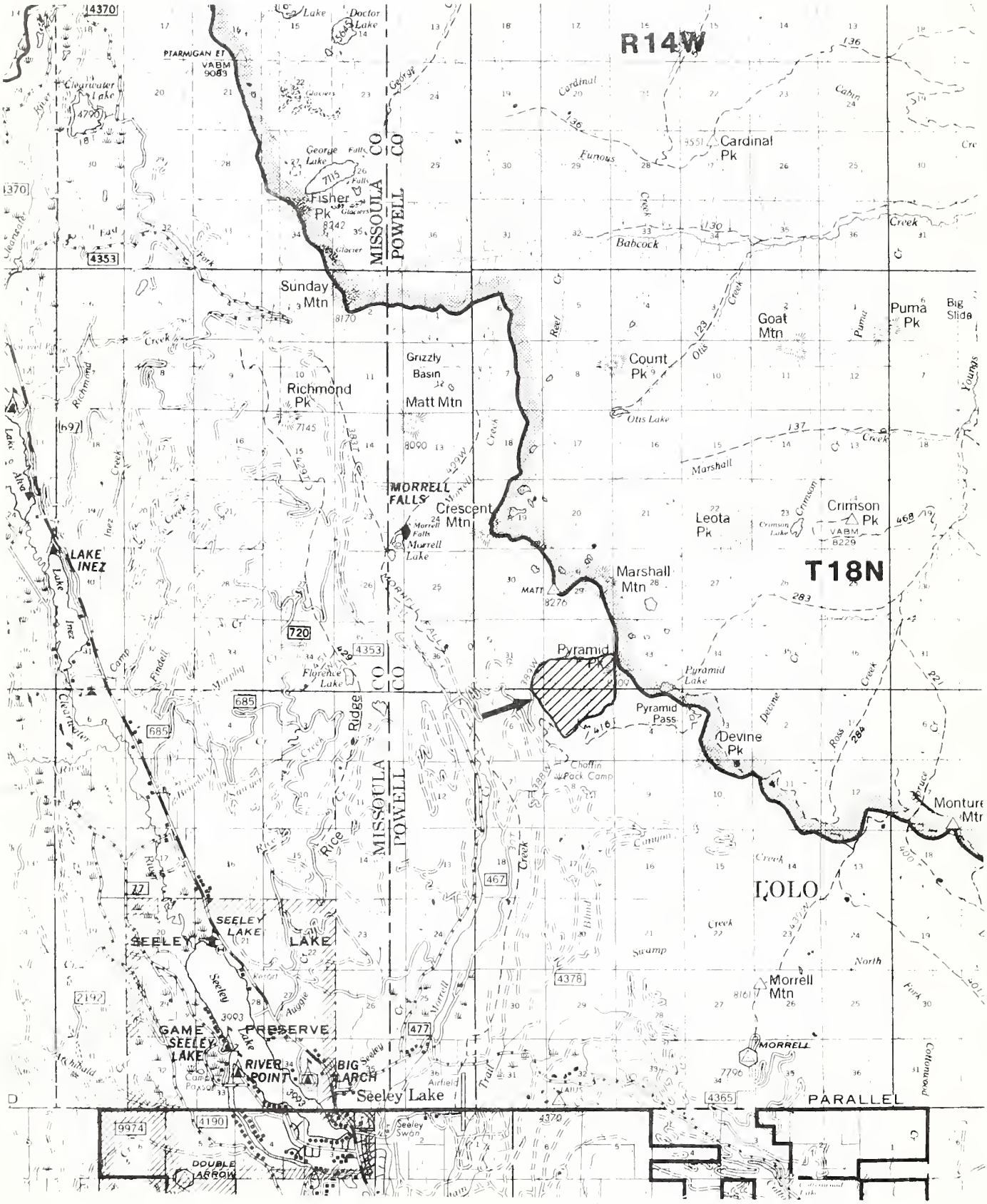
The PC-RNA supports resident or transient use by the following vertebrates:

Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus
Coyote - Canis latrans
Marten - Martes americana
Red squirrel - Tamiasciurus hudsonicus
Porcupine - Erethizon dorsatum
Snowshoe hare - Lepus americanus
Raccoon - Procyon lotor

Avifauna include:
Common raven - Corvus corax
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Spruce grouse - Canachites canadensis
Mtn bluebird - Sialia currucoides
P. woodpecker - Dryocopus pileatus

Plant Ck and East Fork Plant Ck support a variety of planted trout populations of rainbow and eastern brook trout (Salmo gairdneri and Salvelinus fontinalis) including a rainbow-cutthroat hybrid (S. clarki).

PYRAMID CREEK RNA



35. PYRAMID CREEK

RESEARCH NATURAL AREA

This RNA includes the upper montane forest zone as well as subalpine zone, ranging from 1600-2460 m (5300-8100') in west-central MT. Supports mixture of old growth and various seral stages, featuring Douglas-fir, western larch, lodgepole pine, spruce-fir, and whitebark pine types. A snow avalanche track with forb and shrub communities is also included.

****

Pyramid Peak Research Natural Area (PP-RNA) covers 210 ha (520 acres). It supports a mixture of oldgrowth and seral stages representative of the upper montane and subalpine zones in western MT. There are large expanses of both young and mature western larch occupying Douglas-fir sites (potential climax). The subalpine forest zone also supports an abundance of seral forest dominated by lodgepole pine. PP-RNA also supports some types dominated by subalpine fir, Engelmann spruce, and whitebark pine.

PP-RNA is located on the Seeley Lake District of the Lolo National Forest, Missoula Co., MT: 47° 15' N. lat., 113° 25' W. long. It is mapped within the Morrell Lake Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

From Seeley Lake, MT, travel east on FR # 477, 2.5 km (1.5 miles) to the intersection of Morrell Ck Rd # 4353. Travel north 8 km (5 miles) to the intersection with Pyramid Pass trailhead road; travel to road end. Trail # 416 provides general access to both western and eastern parts of PP-RNA. An undeveloped campsite exists at the Pyramid Pass trailhead.

PHYSICAL AND CLIMATIC CONDITIONS

PP-RNA exists on the southern part of the Swan Range, in the upper Clearwater River Valley. The site was subjected to the action of Wisconsin age mountain glaciers, 300 m (990') deep. Some parts were also inundated by glacial lake water. The weather station at Seeley Lake reports an annual precipitation of 55 cm (22"); winter months each have 6-7 cm (2-3"), while summers are below 3 cm (1-1.5"). July temperatures average 16.8° C (62° F), while Jan. is -7° C (19° F).

Belt Series rocks form the geologic foundation, with argillites, quartzites and limestones featured in general area. Soils are grey wooded and brown podzolics form over a glacial till mantle. Soils are shallow at the upper elevations within PP-RNA.

ECOLOGIC VALUES

Forest habitat types occurring in PP-RNA:

Psme/Vagl	ht	[69 ha/170 acres]
Abla/Xete	ht	[39 ha/ 95 acres]
Abla/Vagl	ht	[11 ha/ 28 acres]
Psme/Cage	ht	[16 ha/ 40 acres]
Abla/Clun	ht	[12 ha/ 30 acres]

Snow slide vegetation occupies 34 ha (85 acres).

SAF Cover Types that are present:

206: Spruce-fir	[10 ha/ 25 acres]
208: Whitebark pine	[18 ha/ 45 acres]
210: Douglas-fir	[20 ha/ 50 acres]
218: Lodgepole pine	[60 ha/150 acres]
212: Western larch	[68 ha/165 acres]

Major shrub species include: Pachistima myrsinites, Acer glabrum, Vaccinium globulare, Rosa gymnocarpa, Spiraea betulifolia, Berberis repens, Lonicera utahensis, Amelanchier alnifolia, Rubus parviflorus, Taxus brevifolia, Sorbus sitchensis,and Menziesia ferruginea.

Groundlayer species include: Arnica latifolia, Viola orbiculata, Thalictrum occidentale, Adenocaulon bicolor, Chimaphila umbellata, Pyrola asarifolia, Veratrum viride, Smilacina racemosa, S. stellata, Heracleum lanatum, Epilobium angustifolium, and Xerophyllum tenax.

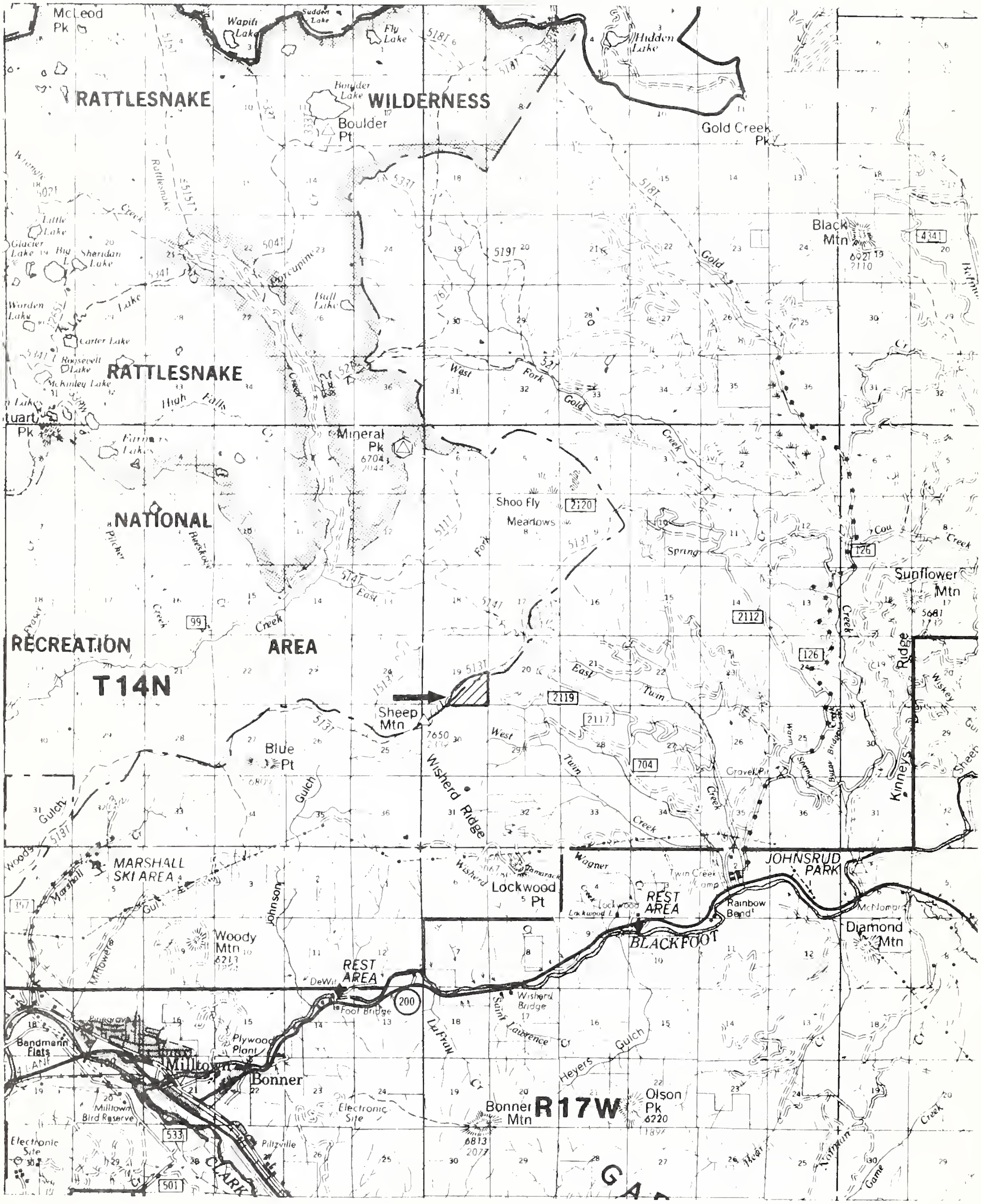
PP-RNA is believed to support the following mammals:

- Grizzly bear - Ursus arctos
- Black bear - U. americanus
- Mountain lion - Felis concolor
- Coyote - Canis latrans
- Elk - Cervus canadensis
- Lynx - Lynx candensis
- Mountain goat - Oreamnos americanus
- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- H. marmot - Marmota caligata
- Marten - Martes americanus
- Wolverine - Gulo gulo
- Pika - Ochotona princeps

Birds found in the PP-RNA include:

- Golden eagle - Aquila chrysaetos
- Spruce grouse - Canachites canadensis
- Blue grouse - Dendragapus obscurus
- Ruffed grouse - Bonasa umbellus
- Horned owl - Bubo virginianus
- Common flicker - Colaptes auratus
- Steller's jay - Cyanocitta stelleri
- Common raven - Corvus corax

SHEEP MOUNTAIN BOG RNA



36. SHEEP MOUNTAIN BOG

RESEARCH NATURAL AREA

The primary ecologic feature of this RNA is a sphagnum (moss) bog that has served in dating Holocene vegetation history. This mountain bog RNA is surrounded by upper montane Douglas-fir forest, as well as subalpine fir, whitebark pine, and lodgepole pine. The bog is 1 ha (2.5 acres) in size and features a variety of forbs and graminoids.

****

The Sheep Mountain Bog Research Natural Area (SMB-RNA) was established in 1987 and is one of the few protected mountain bogs in the northern Rockies. It occupies a cirque basin at 1903 m (6280') in the Rattlesnake Mountains a few miles north of Missoula, MT. Little open water remains, and a wet sedge meadow occupies most of the basin. On the slopes surrounding SMB-RNA forest cover is dominated by Douglas-fir, Engelmann spruce, subalpine fir, lodgepole pine, and whitebark pine. Past fires on these uplands have contributed to the forest history, as well as to the composition of bog deposits that have been recorded from the sampled profiles.

The 42 ha (105 acres) SMB-RNA is located on the Missoula District of the Lolo National Forest, Missoula Co., MT, in the Rattlesnake Mtns: 46° 55' N. lat., 113° 50' W. long. The total elevational range within SMB-RNA is from 1800 m (6000') to 2100 m (7000') at a point below Sheep Mtn (2317 m/7646'). The area is mapped on the Blue Point Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

From Missoula, MT, travel east on I-90 to Bonner, MT., and proceed NE on Hwy # 200 for 17 km (10 miles) to Twin Ck Logging Camp. Travel on Gold Ck Rd # 2112 1.5 km (1 mile) to intersection with E. Twin Ck Rd # 2117. Travel 17 km (10 miles) on Rd # 2117 to SW corner of section 20 (T14N-R17W). Hike west 400 m to reach SMB-RNA. A developed trail to the bog does not exist.

PHYSICAL AND CLIMATIC CONDITIONS

Sheep Mountain Bog was formed within a cirque basin. The bog has accumulated organic deposits including pollen and spores, as well as various PNW volcanic ash layers. Mountain glaciation did take place during the Pleistocene, but earlier glaciation (45-60,000 yrs BP) can also be studied in this area. No specific climatic data exists for the SMB-RNA; it is believed to receive about 127 cm (50") of moisture annually, much in the form of snow.

Deep snow cover accumulates on the bog site. Summers are cool. The soils are coarse and rocky with low water holding capacity.

ECOLOGIC VALUES

The SMB-RNA has the following forest habitat types:

Psme/Cage	ht	[5 ha/13 acres]
Abla/Xete	ht	[9 ha/21 acres]
Abla/Mefe	ht	[17 ha/43 acres]
Abla/Luhi	ht	[10 ha/25 acres]

The following SAF Cover Types occur:

218: Lodgepole pine	[23 ha/57 acres]
210: Douglas-fir	[5 ha/13 acres]
206: Spruce-fir	[10 ha/25 acres]
208: Whitebark pine	[3 ha/ 7 acres]

Major shrub species:
Bog: Kalmia microphylla; Wetland: Alnus sinuata, Spiraea densiflora, Vaccinium occidentale, Ledum glandulosum; Upland: Menziesia ferrunginea, Phyllodoce empetriformis, Vaccinium globulare, and V. scoparium.

Major herbaceous species:
Bog: Eleocharis palustris, Eriophorum chamissonis, Tofieldia glutinosa; Wetland: Calamagrostis canadensis, Ligusticum canbyi, Carex rostrata, Veratrum viride; Uplands: Calamagrostis rubescens, Pyrola secunda and Xerophyllum tenax.

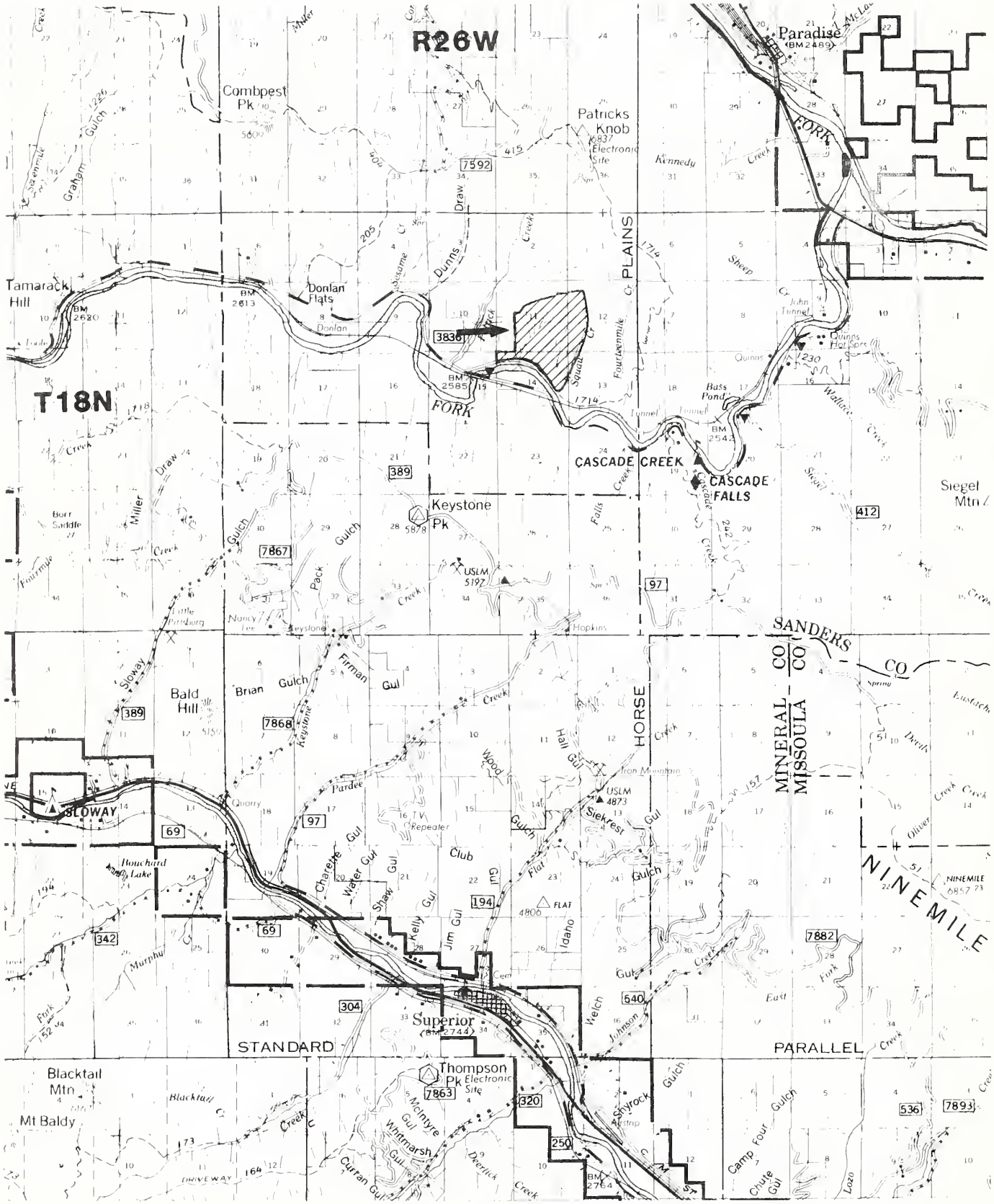
Mammals and birds have not been specifically studied in the SMB-RNA, but the fauna elsewhere in the upper portions of the Rattlesnake Mountains have been studied in part. The northern bog lemming (Synaptomys borealis) has been reported in the general area. The SMB-RNA may also be in an area used the grizzly bear (Ursus arctos). Other mammals include:

Black bear - Ursus americanus
Cougar - Felis concolor
Coyote - Canis latrans
Lynx - Lynx canadensis
Mountain goat - Oreamnos americanus
Mule deer - Odocoileus hemionus

Also present in or near SMB-RNA are species of: woodrat, fisher, ground squirrel, marmot, weasel, vole, marten, shrew, pika, porcupine, red squirrel, snowshoe hare, chipmunk, and wolverine.

A listing of over seventy-six species of birds has been compiled for this part of the Rattlesnake Mountains, many of which occur in or near SMB-RNA: 4 hawk species, 2 eagle, 3 grouse, 6 owl, 7 woodpecker, 4 flycatcher, 3 thrush, and 5 sparrows.

SQUAW CREEK PROPOSED RNA



37. SQUAW CREEK PROPOSED

RESEARCH NATURAL

AREA

This RNA is encompasses a steep south-slope forested-scree system, supporting dry vegetation types dominated by ponderosa pine and Douglas-fir, mixed with bunchgrasses. Several wet-mesic microsites support aspen, water birch, and alder groves. The general area supports a transplanted population of bighorn sheep.

****

The Squaw Creek Research Natural Area (SC-RNA) supports dry forest-bunchgrass vegetation types on much of the 249 ha (616 acres) it occupies in western MT. Conifer dominants are ponderosa pine and Douglas-fir. Associated grasses are Pseudoroegneria spicata and Festuca idahoensis. The area has a history of domestic grazing. Small hardwood groves are dominated by trembling aspen, river birch, and alder. The SC-RNA is located on the Plains District of the Lolo National Forest, Sanders Co., MT: 47° N. lat., 114° 52' W. long. It is included within the Plains Quadrangle, 15' series.

ACCESS AND ACCOMMODATIONS

The SC-RNA is located adjacent to the Clark Fork River, and is accessible directly from Hwy # 135 which connects St Regis (I-90) and Paradise, MT (Hwy # 200). A vehicular track exists along the river's edge providing access to the southern boundary of SC-RNA. A foot trail (# 1714) affords access to upper portions, although foot travel is easily accommodated anywhere on the area's south face. A riverside campsite exists near in the SW corner of the SC-RNA, where a river ferry once operated.

PHYSICAL AND CLIMATIC CONDITIONS

The SC-RNA occurs within the Coeur d'Alene Mtns., occupying a canyon wall through which the Clark Fork River flows. Elevations range from 788 m (2600') at river's edge to 1696 m (5596') at its upper point. No climate station exists nearby; the closest is at Thompson Falls, MT 55 km (33 miles) NW. Annual precipitation there is 56 cm (23"), with most coming in winter months; summers are warm and dry. July temperatures average 20° C (68°F), while Jan. mean is -3.0° C (26° F). SC-RNA's steep south facing slope, however, enhances summer drought stress.

The rocks of SC-RNA are of Precambrian origin; they are sedimentary, mostly argillaceous. A major fault line is responsible for the Clark Fork's direction in this part of Montana. The drainage of Glacial Lake Missoula scoured the sediments and soils from the adjacent valley wall; the modern surface exhibits mostly talus and scree, with scattered rock outcroppings. Pockets of developed soil do exist and support forest and grassland. Toe-slope soils are of transported materials; the alder-birch community has deep, mucky soils.

ECOLOGIC VALUES

The following forest habitat types occur in the SC-RNA:

Scree	ht	[182 ha/450 acres]
Pipo-Pssp	ht	[40 ha/100 acres]
Psme-Pssp	ht	[20 ha/ 50 acres]
Aspen-Birch	ct	[3 ha/ 6 acres]

SAF Cover Types present include:

210: Douglas-fir	[20 ha/ 50 acres]
237: Ponderosa pin	[40 ha/100 acres]
217: Aspen	[1 ha/ 2 acres]

Major shrub species in the SC-RNA are: Prunus virginiana, P. emarginata, Spiraea betulifolia, Holodiscus discolor, Amelanchier alnifolia, Symphoricarpos albus, Philadelphus lewisii, Sambucus cerulea, Acer glabrum, Rhus radicans, R. glabra, Arctostaphylos uva-ursi, and Physocarpus malvaceus.

Common groundlayer species are:

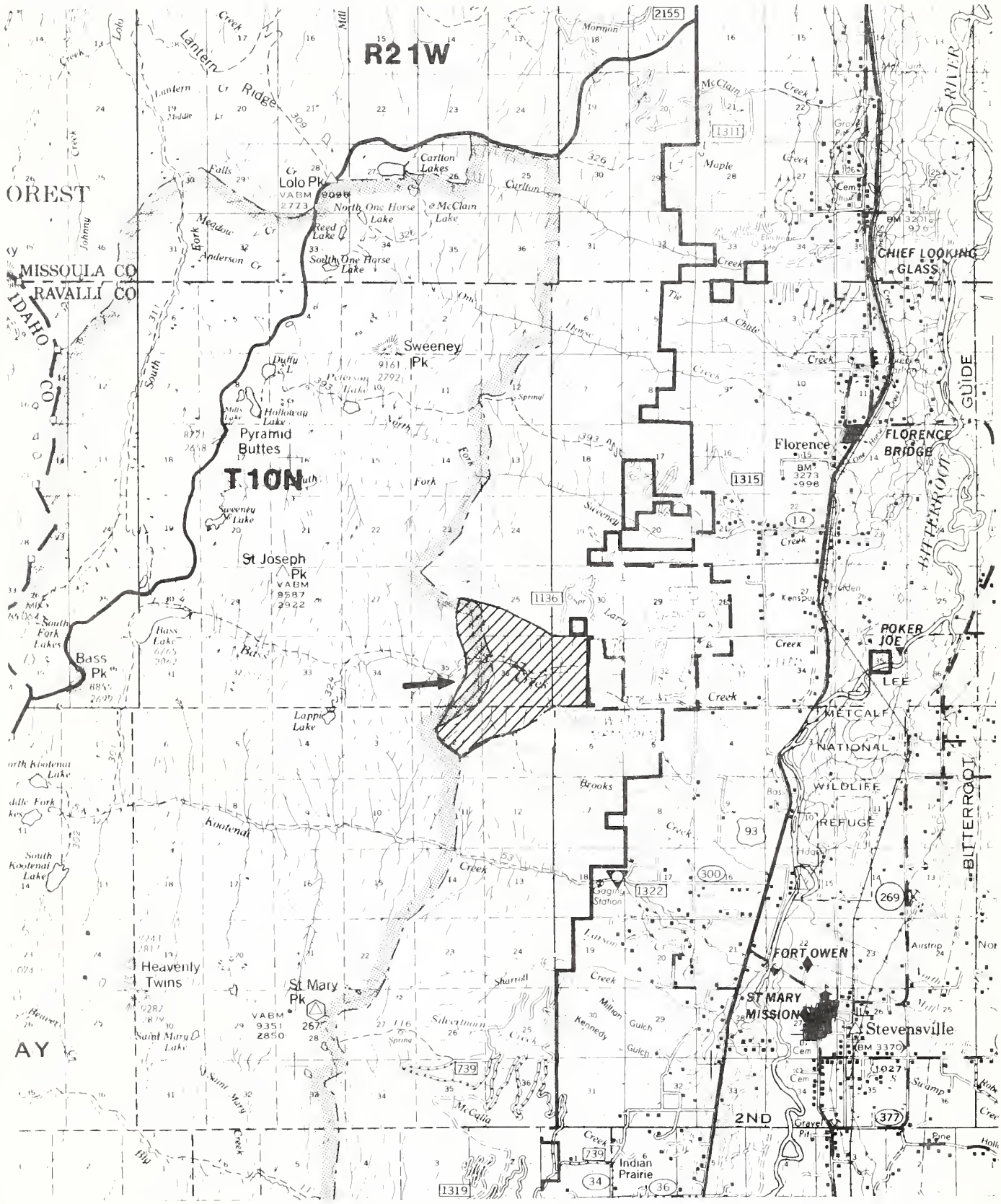
Pseudoroegneria spicata, Festuca idahoensis, Bromus tectorum, Poa pratense, Carex geyeri, Balsamorhiza sagittata, Achillea millefolium, Calochortus apiculatus, Smilacina stellata, Penstemon wilcoxii, Woodsia oregona, Heuchera cylindrica and other prairie and wetland species.

Mammals present in SC-RNA include:
Bighorn sheep - Ovis canadensis
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Black bear - Ursus americanus
Coyote - Canis latrans
Mountain lion - Felis concolor
Beaver - Castor canadensis
Racoon - Procyon lotor

Birds species present:
Bald eagle - Haliaeetus leucocephalus
Golden eagle - Aquila chrysaetos
Common raven - Corvus corax
Red-tailed hawk - Buteo jamaicensis
Sharp-shinned hawk - Accipiter striatus
P. woodpecker - Dryocopus pileatus
Ruffed grouse - Bonasa umbellus

plus woodland and shore birds that utilize the birch wetland and river edge habitats.

BASS CREEK PROPOSED RNA



38. BASS CREEK PROPOSED RESEARCH NATURAL AREA

Located in the northern Bitterroot Mtns., this RNA supports forests dominated by grand fir, with associated conifers: Douglas-fir, western yew, subalpine fir and Engelmann spruce. A disjunct population of western white pine is present. The Bass Ck drainage has western larch which is near its southeastern range limits. Bass Ck is a type III, steep gradient stream; a small impoundment (pond) is also present.

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The Bass Ck Research Natural Area (BC-RNA) occupies 802 ha (1980 acres) in the Bitterroot Mtns., in western MT; a portion of the BC-RNA is located within the Selway-Bitterroot Wilderness. All of the area is located on the ID Batholith. The lowest, streamside elevation is 1242 m (4100'), the highest is 2549 m (8411'). Mesic conifer forests dominated by grand fir occupy much of the streamside habitats of this RNA. Western white pine is present in low numbers and represents a disjunct population in this part of MT. Douglas-fir occupies the montane zone; subalpine fir and whitebark pine dominate the subalpine and timberline zones.

When the wilderness portion of the Bass Creek drainage is included with the remainder of BC-RNA, a lengthy, intact drainage system is available (snowfields down to valley bottom). The Bass Creek canyon was subjected to Pleistocene glaciation; the BC-RNA's north slope ("glacial trough wall") has considerable exposed parent rock, portions of which break off and crash down through the streamside forests.

The BC-RNA is located on the Stevensville District of the Bitterroot National Forest, Ravalli Co., MT: 46° 35' N. lat., 114° 10' W. long. The area is mapped within the Saint Mary Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

Access to BC-RNA is via Hwy # 93, 6 km (3.5 miles) north of the Stevensville turnoff; enter the Charles Waters Memorial Campground, the trail into BC-RNA is at the west end of this campground. Trail # 4 follows the entire length of the drainage. The upper elevations on the northern half of BC-RNA may be reached by forest roads that approach near the BC-RNA boundary.

PHYSICAL AND CLIMATIC CONDITIONS

BC-RNA is representative of many of the east slope Bitterroot Mtn. drainages; the north and south-facing slopes are designated as "glacial trough walls". The south slopes are rugged rockland units; the north-facing slopes have deeper soil development. The streamside sites are composed of colluvium from the adjacent walls.

There are no established weather otations near this RNA; the nearest is at Stevensville, MT, 10 km (6 miles) to the southeast, at 1023 m (3375'). Another private climate station is near Florence, MT, 8 km (5 miles) NE of BC-RNA. It is estimated that the lower part of BC-RNA has an annual temperature of 6.8° C (44° F), and the highest, -2.2° C (28° F). Annual precipitation is about 38 cm (15") at lower sites, and 115 cm (45") at the upper elevations.

ECOLOGIC VALUES

The following forest habitat types are found in the BC-RNA:

Psme/Phma	ht	[122 ha/300 acres]
Psme/Libo	ht	[62 ha/150 acres]
Psme/Eqar	ht	[20 ha/ 50 acres]
Abgr/Clun	ht	[122 ha/300 acres]
Abgr/Libo	ht	[40 ha/100 acres]
Abla/Clun	ht	[40 ha/100 acres]
Abla/Mefe	ht	[103 ha/255 acres]
Abla/Xete	ht	[202 ha/500 acres]
Pial/Abla	ht	[40 ha/100 acres]
Nonforested		[48 ha/120 acres]
Wetlands		[2 ha/ 5 acres]

The SAF Forest Cover Types:

206: Spruce-fir	[144 ha/355 acres]
208: Whitebark pine	[40 ha/100 acres]
210: Douglas-fir	[82 ha/200 acres]
212: Western larch	[40 ha/100 acres]
213: Grand fir	[93 ha/230 acres]
215: W. white pine	[28 ha/ 70 acres]
218: Lodgepole pine	[243 ha/600 acres]
237: Ponderosa pine	[82 ha/200 acres]

Major shrub species include: Acer glabrum, Amelanchier alnifolia, Physocarpus malvaceus, Holodiscus discolor, Philadelphus lewisii, Lonicera utahensis, Cornus stolonifera, Rosa gymnocarpa, Rubus parviflorus, Sorbus scopulina, Berberis repens, Vaccinium globulare, Spiraea densiflora, Phyllodoce empetriformis, Kalmia microphylla, and Ledum glandulosum.

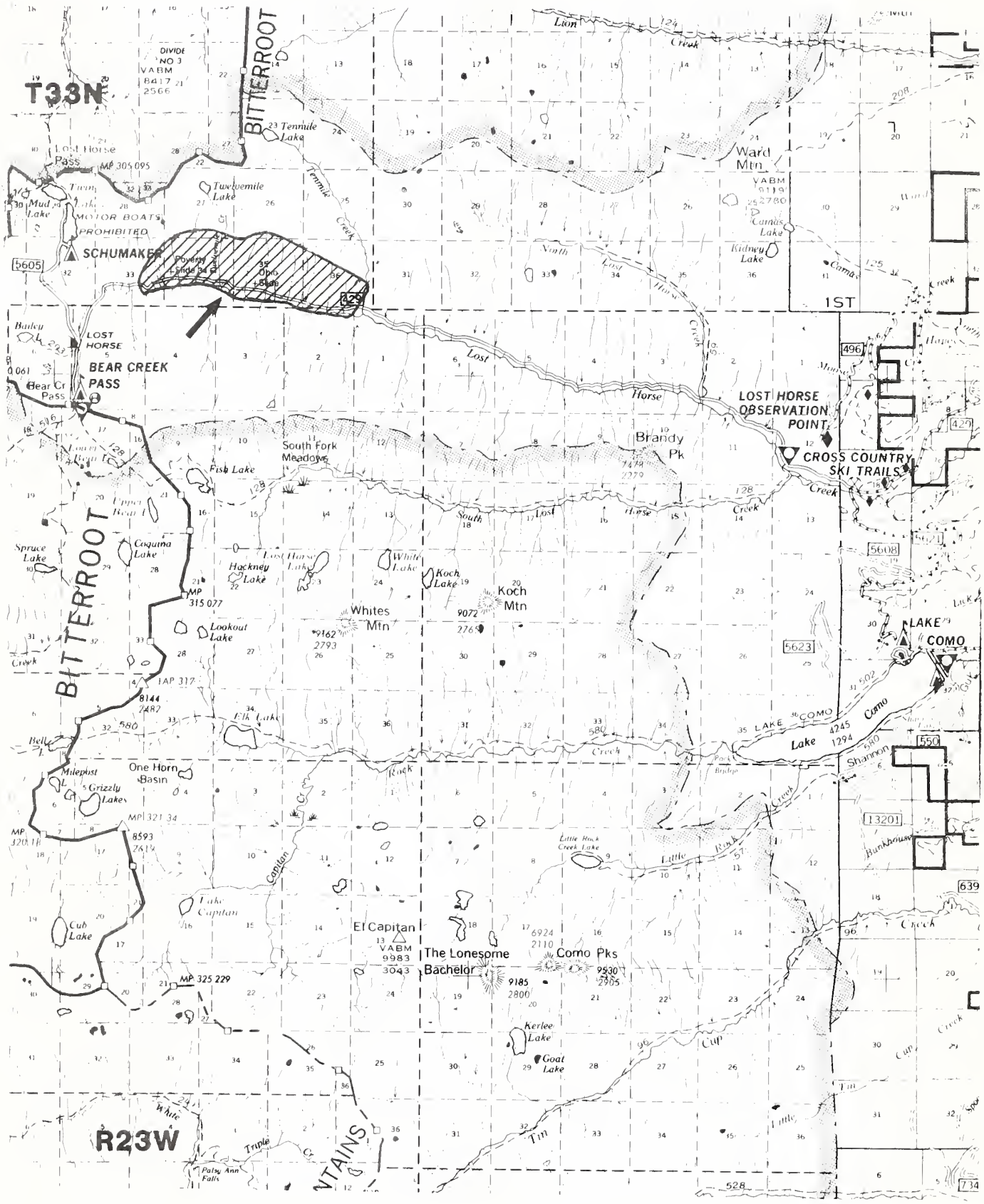
Common herbaceous species are: Achillea millefolium, Clintonia uniflora, Calamagrostis rubescens, Carex geyeri, Festuca idahoensis, Angelica arguta, Pseudoroegneria spicata, Arnica cordifolia, Galium triflorum, Balsamorhiza sagittata, Clarkia pulchella, Erythronium grandiflorum, Senecio triangularis, Mitella stauropetala, Pyrola secunda, Smilacina stellata, Tiarella trifoliata, Veratrum viride, and Xerophyllum tenax.

Some mammals common in the BC-RNA include:

Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Moose - Alces alces
Porcupine - Erethizon dorsatum
Bobcat - Lynx rufus
Mtn lion - Felis concolor
Beaver - Castor canadensis
Black bear - Ursus americanus

Avifauna include:
Ruffed Grouse - Bonasa umbellus
Spruce Grouse - Canachites canadensis

BITTERROOT MOUNTAIN SNOW AVALANCHE PROPOSED RNA



39. BITTERROOT MOUNTAIN SNOW AVALANCHE PROPOSED RESEARCH NATURAL AREA

This RNA consists of several active avalanche tracks that have cut through spruce-fir forest. The slide tracks extend from steep headwalls at 2100 m (7000') down to "run-out" zones at 1700 m (5500'). The area features a variety of herbaceous-shrub community types that represent various post-disturbance recovery stages. The RNA site also features a remote control SNO-TEL station.

****

The Bitterroot Mountain Snow Avalanche Research Natural Area (BMSA-RNA) encompasses 756 ha (1930 acre) of mountain terrain in the upper portion of the Lost Horse Canyon drainage in western Montana. The highlight is a series of active snow avalanche tracks that periodically experience the destructive force of large scale snow slippages. The adjacent forest communities (separating slide tracks) are dominated by subalpine fir, Engelmann spruce, lodgepole pine, and whitebark pine. The forest-slide track margins support conifers that have been mechanically damaged by the cascading snow.

The slide tracks originate on steep headwalls where snow accumulates and is triggered into slides; the high volume of moving snow generally removes or seriously mangles all conifers leaving only shrub and herb species; and the bottom portion or "run-out" zone where some scattered but damaged conifers exist among a shrubland/herbland vegetation.

The BMSA-RNA is located on the Darby District of the Bitterroot National Forest, Ravalli Co., MT: 46° 8' N. lat., 114° 26' W. long. The entire area is mapped within the Tenmile Lake Quadrangle, (MT/IDA), 7.5' series.

ACCESS AND ACCOMMODATIONS

The BMSA-RNA is located approximately 16 km (26 miles) west of Hamilton, MT; Hwy # 93 is taken south to intersect with the Lost Horse Ck Rd # 429. This latter road intercepts two of the main avalanche tracks, Ohio Slide and Poverty Slide. Upon arriving at these points access to the upper parts of the slides is achieved by walking the slide tracks themselves. On-site truck or tent camping is possible; a Forest Service wilderness guard station facility exists a short distance away near Bear Ck Pass.

PHYSICAL AND CLIMATIC CONDITIONS

The Bitterroot Mtns. represent a large-scale block faulting, composed of granite rock. The specific Lost Horse Canyon region is a batholith intrusion. During the Pleistocene a glacier filled Lost Horse Canyon, carving a U-shape.

The BMSA-RNA receives about 125 cm (50") of precipitation annually, much in the form of snow between Oct. and Mar. The lower elevations accumulate about 2.5 m (8') of snow, while the upper slopes get 3-3.5 m (10-12'). The snow cornices that develop on the slide track headwalls is even greater.

ECOLOGIC VALUES

The following forest habitat types are found on the BMSA-RNA:

Abla/Mefe	ht	[115 ha/285 acres]
Abla/Xete-Vagl	ht	[89 ha/220 acres]
Abla/Xete-Vasc	ht	[95 ha/235 acres]
Abla/Pial	ht	[111 ha/275 acres]
Abla/Caca	ht	[28 ha/ 70 acres]
Abla/Clun-Clun	ht	[38 ha/ 95 acres]
Abla/Clun-Mefe	ht	[83 ha/205 acres]

All forests fit into SAF Types 206 and 208 (Spruce-fir & whitebark pine). Other trees present include Douglas-fir, ponderosa pine and aspen.

Snow avalanche tracks occupy the following areas:

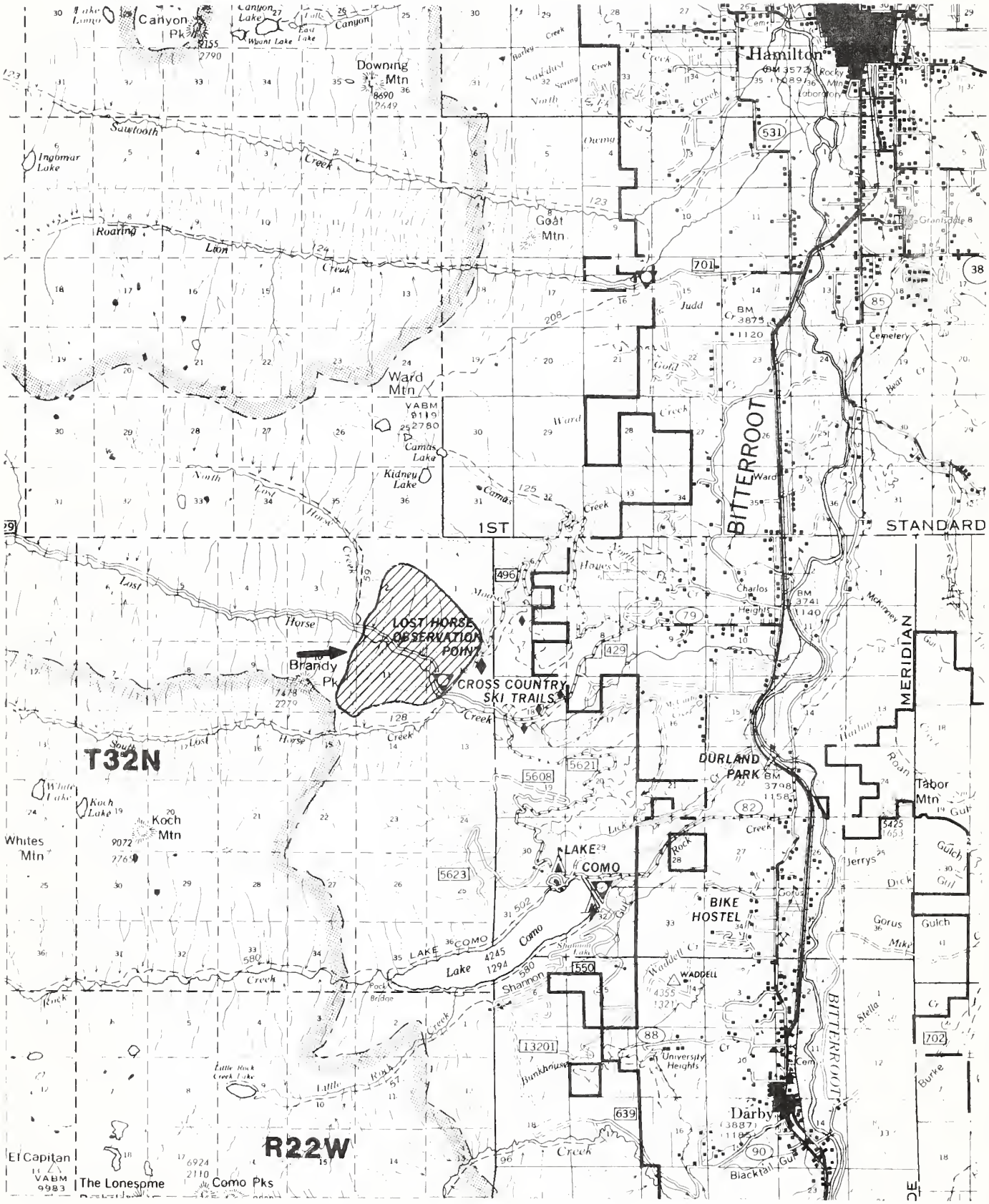
Poverty slide	[83 ha/205 acres]
Ohio slide	[91 ha/225 acres]
Other slide tracks	[46 ha/115 acres]

Over 200 vascular plants have been documented for the BMSA-RNA, many of which are herbaceous and graminoid species that specifically occupy the deforested avalanche tracks. Specific research on these slide tracks has been conducted by Stauffer (1976, MA Thesis, Univ. MT).

The major shrub species are: Alnus sinuata, Amelanchier alnifolia, Berberis repens, Cornus stolonifera, Ledum glandulosum, Lonicera utahensis, L. involucrata, Menziesia ferruginea, Phildelphus lewisii, Prunus virginiana, Ribes lacustre, Rubus idaeus, R. parviflorus, Sambucus racemosa, Spiraea betulifolia, S. densifolia, Vaccinium caespitosum, V. globulare, and V. scoparium.

Mammals using the BMSA-RNA include:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Mountain goat - Oreamnos americanus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus
Pika - Ochotona princeps

LOWER LOST HORSE CANYON PROPOSED RNA



40. LOWER LOST HORSE CANYON

PROPOSED

RESEARCH NATURAL

AREA

This RNA encompasses an array of conifer forest types ranging from streamside grand fir-Engelmann spruce, western redcedar-yew communities, montane Douglas-fir-ponderosa pine stands, and upper slope subalpine fir-whitebark pine forests. Much of this RNA serves as winter range for mountain goats.

****

The Lower Lost Horse Canyon Research Natural Area (LLHC-RNA) spans a cross-section of a typical drainage in the Bitterroot Mountains in western Montana. The elevational range extends from near 1300 m (4300') at streamside up to adjacent ridges of 2100 m (6900'), to the south, and 2400 m (8000') on the north rim. The LLHC-RNA covers 568 ha (1402 acres). Streamside forests are dominated by grand fir, Engelmann spruce, and black cottonwood, with coastal species western redcedar and western yew also present. Ponderosa pine and Douglas-fir, form open forests on adjacent upland slopes. These two conifers also form more dense stands on the middle slopes on both the north- and south-facing aspects above the streambottom. Rocky talus slides occupy some of the LLHC-RNA's steep slopes on both the north and south sides. These rocky portions also support open, scattered or sometimes clustered populations of subalpine fir and whitebark pine.

The LLHC-RNA is located on the Darby District of the Bitterroot National Forest, Ravalli Co., MT: 46° 7' N. lat., 114° 15' W. long. The area is mapped within the Como Peaks and Ward Mountain Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The LLHC-RNA is located southwest of Hamilton, MT; hwy # 93 is taken south to intersection with the Lost Horse Ck Rd # 429. This road extends along the entire length of the RNA, adjacent to Lost Horse Ck, and thus provides easy access to all of the streamside and lower montane areas. During summer months another road extending to the Lost Horse Observation Point at 1825 m (6000') provides access to the upper parts of the LLHC-RNA's northern half. Maintained trails provide access to other areas although the upper reaches are very steep.

PHYSICAL AND CLIMATIC CONDITIONS

The Bitterroot Mountains represent a large-scale block faulting, composed of granite rock. The specific Lost Horse Canyon region is a batholith intrusion. During the Pleistocene a glacier filled Lost Horse Canyon, carving a U-shaped valley.

The LLHC-RNA receives about 75 cm (30") of precipitation annually at its lower reaches, and at least double that amount at the higher limits (often as winter snow). The nearest maintained climate station is at Darby, MT in the Bitterroot Valley. No temperature data are available for this RNA site.

ECOLOGIC VALUES

The following forest habitat types are found on the LLHC-RNA:

Pipo/Psme-Caru ht	[75 ha/185 acres]
Pipo/Psme-Libo ht	[112 ha/276 acres]
Pipo/Psme-Xete ht	[124 ha/306 acres]
Abla/Pial (NE) ht	[109 ha/270 acres]
Abla/Pial (SW) ht	[148 ha/365 acres]

The forests fit into the following SAF Types:

237: Ponderosa pine	[125 ha/310 acres]
210: Douglas-fir	[170 ha/420 acres]
206: Spruce-fir	[127 ha/315 acres]
208: Whitebark pine	[114 ha/282 acres]
218: Lodgepole pine	[30 ha/ 75 acres]

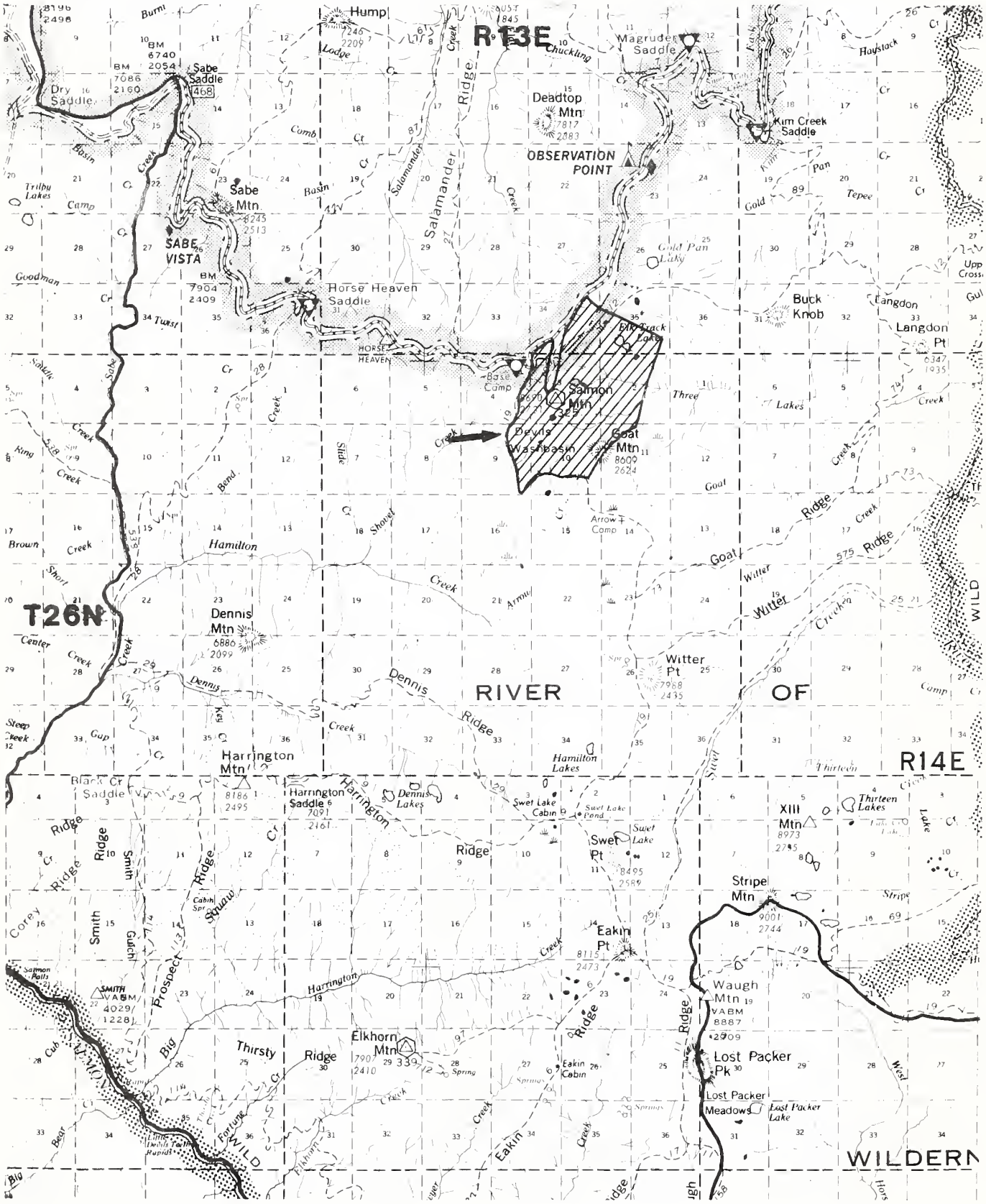
Major shrub species in LLHC-RNA are: Amelanchier alnifolia, Berberis repens, Ceanothus velutinus, Cornus stolonifera, Holodiscus discolor, Menziesia ferruginea, Physocarpus malvaceus, Rosa gymnocarpa, Phildelphus lewisii, Prunus virginiana, Ribes lacustre, Rubus idaeus, R. parviflorus, Sambucus racemosa, Spiraea betulifolia, S. densifolia, Vaccinium globulare, and V. scoparium.

Representative groundlayer species: Athyrium filix-femina, Dryopteris filix-mas, Pseudoroegneria spicata, Festuca idahoensis. Carex geyeri, Calamagrostis rubescens, Clintonia uniflora, Heracleum lanatum, Trillium ovatum, Xerophyllum tenax, Streptopus amplexifolius, Erythronium grandiflorum, Trautvetteria carolinensis, and Tiarella trifoliata.

Mammals using the LLHC-RNA include:
- Elk - Cervus canadensis
- Mule deer - Odocoileus hemionus
- Mountain goat - Oreamnos americanus
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Bobcat - Lynx rufus
- Pika - Ochotona princeps
- Marten - Martes americana
- Porcupine - Erethizon dorsatum
- Beaver - Castor canadensis
- Snowshoe hare - Lepus americanus

Birds utilizing this RNA include:
- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Mtn. bluebird - Sialia currucoides
- Pile. woodpecker - Dryocopus pileatus
- Dipper - Cinclus mexicanus
- Steller's jay - Cyanocitta stelleri

SALMON MOUNTAIN PROPOSED RNA



41. SALMON MOUNTAIN PROPOSED

RESEARCH NATURAL

AREA

Located in the SW portion of the Bitterroot Mtns. in east-central ID, this RNA features alpine larch communities within a typical mountain setting. Closely associated are forests dominated by Engelmann spruce, subalpine fir, and whitebark pine. Green fescue mountain grasslands are also present, as are several wetlands: cold springs, streams and tarns.

****

The Salmon Mtn. Research Natural Area (SM-RNA) features a representative assortment of alpine larch forest communities occupying a variety of topographic situations; The SM-RNA occupies 832 ha (2054 acres) much of it above 2424 m (8000'). The alpine larch forms mixtures with whitebark pine, Engelmann spruce, and subalpine fir. The highest elevation within the SM-RNA is Salmon Mtn. at 2710 m (8943').

The alpine larch displays growth-form variations, ranging from single, erect stem types in protected sites, to shorter, multi-stemmed forms on the higher exposed sites. Larch parks and glades of larch saplings are present. The whitebark pine forms ribbon forests; this pine has a history of mountain pine beetle (Dendroctonus ponderosae) attacks and damage by blister rust (Cronartium ribicola), forming extensive "ghost" forests. Festuca viridula dominated meadows are interspersed among the forests on the west slopes of Salmon and Goat Mountains.

The SM-RNA is located on the West Fork District, Bitterroot National Forest, Idaho Co., ID (Salmon River Breaks Wilderness): 45° 37' N. lat., 114° 50' W. long. The area is mapped within the Salmon Mtn. SE and Salmon Mtn. NE Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The SM-RNA has good road access. It is located on the Nez Perce Trail Rd # 468 which connects Darby, MT and Elk City ID. It is accessible during summer months. Forest Service Trail # 19 borders the SW section of the RNA, and Trail # 12 connects the Salmon Mtn. lookout with the RNA's northern boundary. A jeep trail serves the lookout itself.

PHYSICAL AND CLIMATIC CONDITIONS

This part of the Bitterroot Mtns. reflect Pleistocene glaciation, with scoured cirques and steep cliffs present. Cryoplanation is evidenced in the form of the rounded west slopes of Salmon Mtn. The SM-RNA's annual precipitation is estimated to be over 100 cm (40"); 70% comes as snow.

Average annual temperatures at 2700 m (9000') are about -1.2° C (30° F); at 2100 m (7000'), these rise to 2.8° C (37° F). Average daily max and min temperatures for July are 18° C (65° F) and 7° C (45° F). The high peaks are also very windy.

ECOLOGIC VALUES

The following forest habitat types are found on the SM-RNA:

Abla/Luhi	ht	[318 ha/786 acres]
Pial	ht	[101 ha/250 acres]
Laly/Abla	ht	[27 ha/ 66 acres]
Pial/Abla	ht	[177 ha/437 acres]
Abla/Caru	ht	[14 ha/ 33 acres]
Mixed Forest		[51 ha/126 acres]
Talus/Scree		[132 ha/326 acres]
Tarns		[12 ha/ 30 acres]

The forests fit into the following SAF Types:

206: Spruce-fir [383 ha/945 acres]
208: Whitebark pine (inc larch) [305 ha/753 acres]

Major shrub species in SM-RNA are: Juniperus communis, Ledum glandulosum, Phyllodoce empetriformis, and Vaccinium scoparium.

Representative groundlayer species: Carex geyeri, C. nigricans, C. rossi, Calamagrostis canadensis, Luzula hitchcockii, Festuca ovina, F. viridula, Epilobium alpinum, Mimulus lewisii, Xerophyllum tenax, Saxifraga arguta, Erythronium grandiflorum, Sibbaldia procumbens, and Veratrum viride.

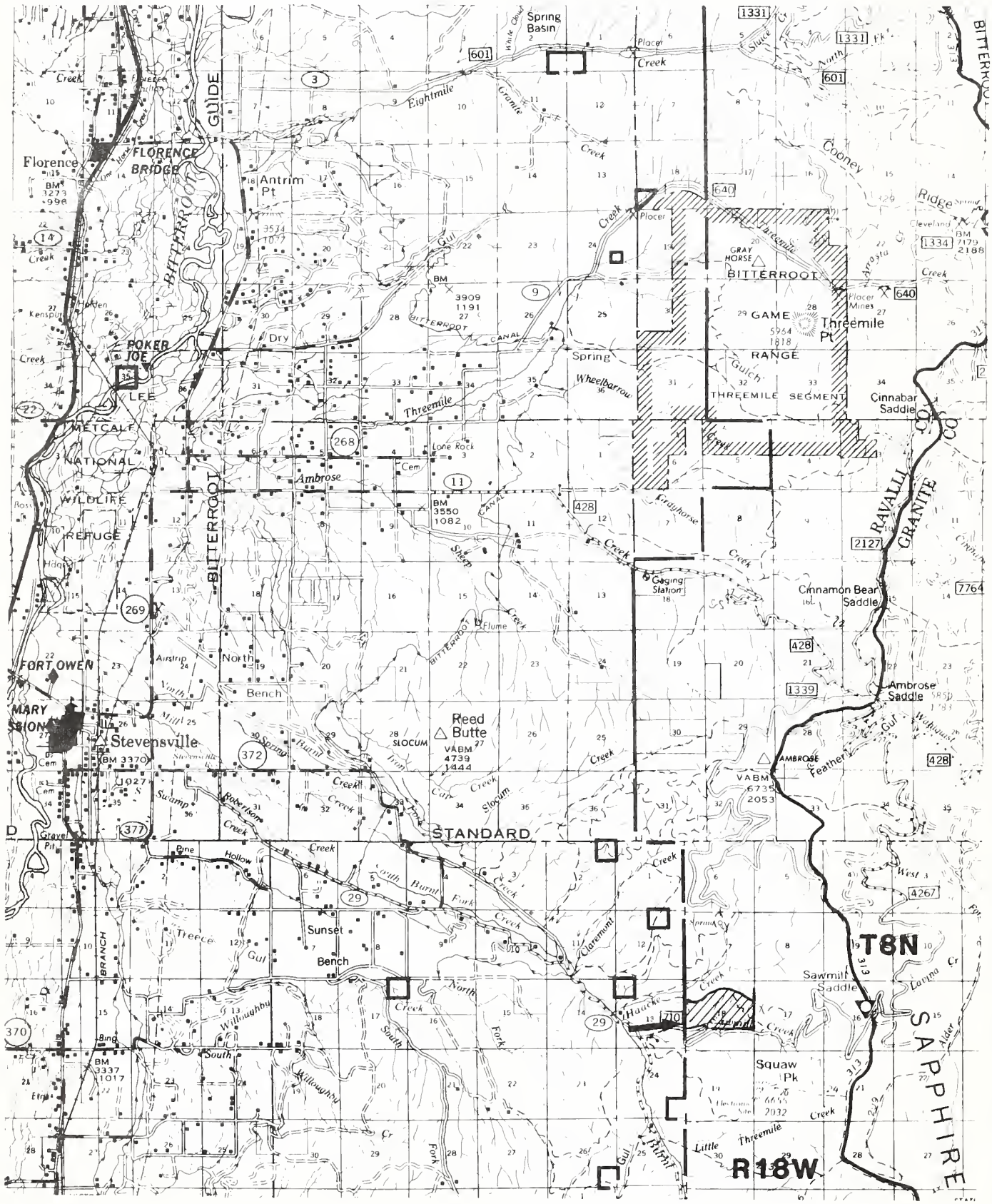
Representative mammals using the SM-RNA include:

Elk - Cervus canadensis
W-t. deer - Odocoileus virginianus
Black bear - Ursus americanus
Bobcat - Lynx canadensis
Mtn. goat - Oreamnos americanus
Bighorn sheep - Ovis canadensis
Pika - Ochotona princeps
Y-b. marmot - Marmota flaviventris
N. pocket gopher - Thomomys talpoides
Snowshoe hare - Lepus americanus
Coyote - Canis latrans

Birds utilizing the SM-RNA:

Common raven - Corvus corax
Ruffed grouse - Bonasa umbellus
C's. nutcracker - Nucifraga columbiana
Mtn. chickadee - Parus gambeli
Pine grosbeak - Pinicola enucleator
Pine siskin - Spinus pinus

SAWMILL CREEK PROPOSED RNA



42. SAWMILL CREEK PROPOSED RESEARCH NATURAL AREA

This RNA consists of a 63 ha (155 acres) native bunchgrass prairie, dominanted by bluebunch wheatgrass, Idaho fescue and rough fescue. Scattered ponderosa pine on open slopes and Douglas-fir forests in cool ravine sites are also present. Juniper and sagebrush populations also exist in this RNA.

****

The Sawmill Ck Research Natural Area (SC-RNA) features a high quality bunchgrass prairie with a history of only light grazing and today exists in excellent compositional condition; fencing assures continued recovery. Major grasses are Pseudoroegneria spicata, Festuca idahoensis and F. scabrella. Ponderosa pine is scattered throughout forming savanna communities; several of the pines have multiple fire scars. In moist, sheltered ravines, Douglas-fir forms woodland stands. Aspen and Engelmann spruce occur along upper Sawmill Ck.

SC-RNA is located on the Stevensville District, Bitterroot National Forest, Ravalli Co., MT: 46° 27' N. lat., 113° 53' W. long. It is mapped within the USGS Corley Gulch Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

SC-RNA is located 22 km (14 miles) by road from Stevenville, MT. From this town travel south to Burnt Fork Ck Rd # 372; continue SE on Rd # 372 to Gold Ck-Sawmill Ck intersection ("Y" = Rd # 312); follow Sawmill Ck Rd # 710 1.5 miles to west boundary area of SC-RNA. A logging road extends from Rd # 710 into the SC-RNA's upper reaches. There are no developed campgrounds near SC-RNA, but overnight accommodations exist at Stevensville, MT.

PHYSICAL AND CLIMATIC CONDITIONS

SC-RNA is positioned in the foothill zone between the Bitterroot Mtn Range to the west and the Sapphire Range Divide to the east). The latter is composed of folded Precambrian sedimentary rocks (argillites). Teritary valley fill exists nearby (foothill benches), partially washed out during the last ice age. Grassland sites exhibit organic-rich upper epipedon (Chestnut & Chernozem), although talus-scree occupies some surfaces. This part of the Bitterroot Valley is influenced by maritime air masses at times and sometimes by arctic continental air from the east. Annual precipitation (Stevensville) totals about 33 cm (13") with dry summers; July temps average 18 C (65° F), while Jan. is -5° C (23° F).

The SC-RNA is located is in a management unit dedicated primarily to wildlife habitat. Some stock grazing has taken place on the SC-RNA but such use has not been allowed in recent decades. Some timber cutting has taken place above the upper boundary of the SC-RNA.

ECOLOGIC VALUES

The SC-RNA supports the following habitat types:

Feid/Pssp Pssp/Posa Fesc/Pssp	- [22 ha/55 acres]
Pipo/bunchgrass	- [16 ha/40 acres]
Psme/grass-shrub	- [10 ha/25 acres]
Sagebrush/grass	- [2 ha/ 5 acres]
Juniper/grass	- [2 ha/ 5 acres]

The SAF Cover Types include:

237: Ponderosa pine	[16 ha/40 acres]
210: Douglas-fir	[10 ha/25 acres]
238: Juniper	[2 ha/ 5 acres]

Major shrub species present are: Amelanchier alnifolia, Prunus virginiana, Lonicera utahensis, Symphoricarpos albus, Physocarpus malvaceus, Philadelphus lewisii, Artemisia tridentata, Acer glabrum, Berberis repens, Sorbus scopulina, and Ribes spp.

Graminoid species include: Pseudoroegneria spicata, Bromus tectorum, Calamagrostis rubescens, Festuca idahoensis, F. scabrella, Koeleria cristata, Poa sandbergi, and Carex rossii.

Over seventy forbs have been documented on the SC-RNA, typical of both grassland and woodland species occurring in western MT.

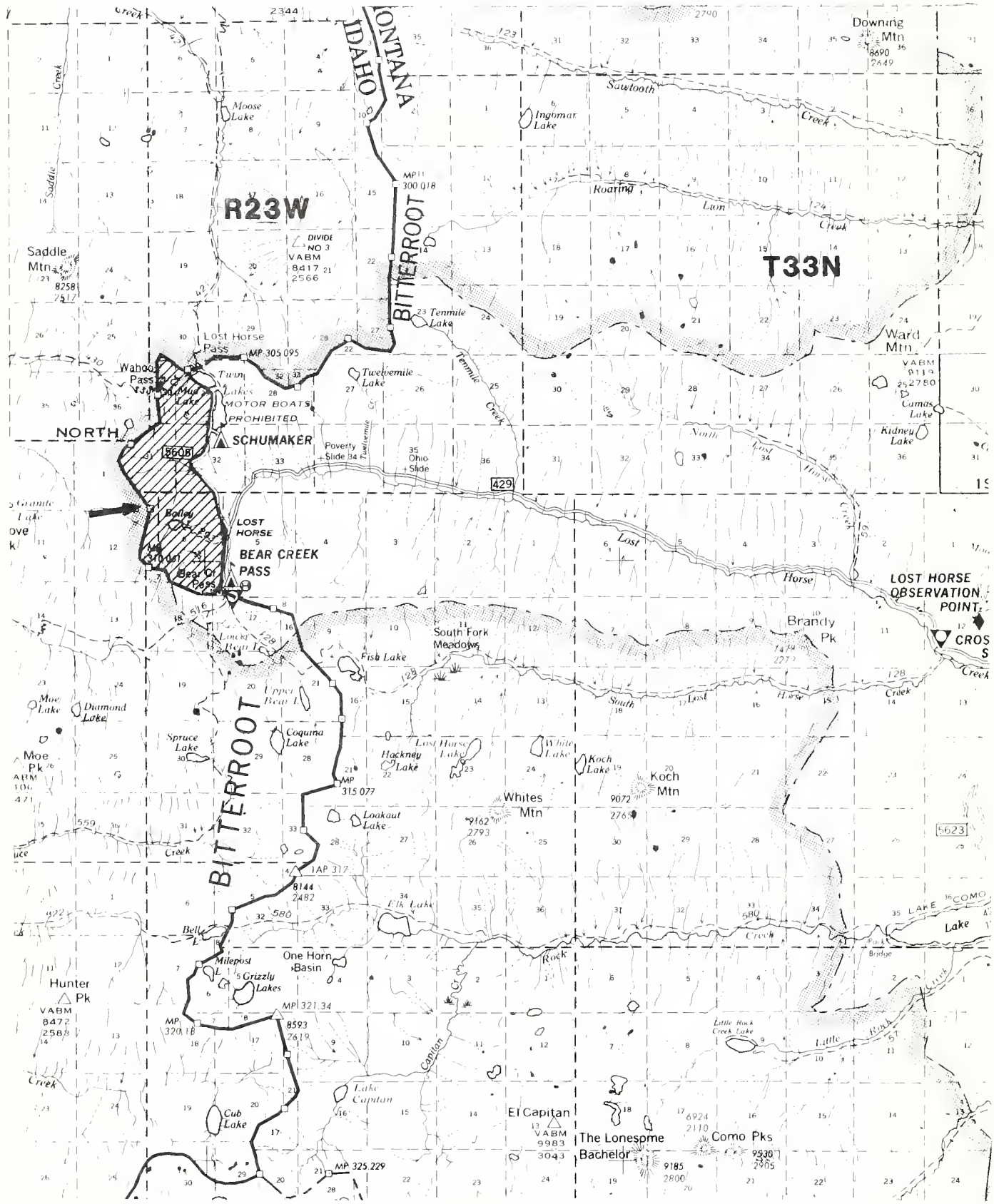
A systematic inventory of the fauna occupying the area that includes SC-RNA has not been made. Other wildlife resource studies suggest the presence of:

Mammals:

Black bear - Ursus americanus
Bighorn sheep - Oreamnos americanus
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Mountain lion - Felis concolor
Lynx - Lynx canadensis
Coyote - Canis latrans
Raccoon - Procyon lotor

Birds include:
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Common raven - Corvus corax
Woodpeckers - Dryocopus & Dendrocopos

UPPER LOST HORSE CANYON PROPOSED RNA



43. UPPER LOST HORSE CANYON PROPOSED

RESEARCH NATURAL AREA

This RNA is composed of subalpine zone forest covering 820 ha (2025 acres); itfeatures subalpine fir, Engelmann spruce, whitebark pine, lodgepole pine and alpine larch at 2000 m (6600') in Bitterroot Mtns. of western MT. Old growth and developmental forests form mosaic patterns related to rockland physiography and past fires.

****

The Upper Lost Horse Canyon Research Natural Area (ULHC-RNA) is located in the Bitterroot Mtns. in west-central MT. ULHC-RNA supports a mixture of forest types dominated by subalpine fir, Engelmann spruce, whitebark pine, and lodgepole pine. Present, but less common is alpine larch. Two small lakes, together totalling 4 ha (9 acres) are included within the ULHC-RNA. This RNA is located on the Darby District, Bitterroot National Forest, Ravalli Co., MT: 46° 10' N. lat., 114° 30' W. long. ULHC-RNA is mapped on the Tenmile Lake, El Capitan, Hunter Peak and Saddle Mtn Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

ULHC-RNA can be reached by travelling approximately 16 km (10 miles) south of Hamilton, MT to the Lost Horse Canyon Rd # 429, and proceeding west about 25 km (15 miles) to Bear Ck Pass at the MT-ID stateline. The stateline serves as the western boundary of ULHC-RNA; the Twin Lakes branch road, ending at Lost Horse Pass, serves as the east boundary. Pack trails provide access to both northern and southern interiors of ULHC-RNA. Campgrounds exist at both ends. This RNA is contiguous with the Selway-Bitterroot Wilderness.

PHYSICAL AND CLIMATIC CONDITIONS

The exact climatic conditions are not known for the ULHC-RNA; it is believed the summer temperatures average about 13° C (55° F) and annual precipitation a little more than 100 cm (40"), most in the form of snow. Snowpacks may achieve depths over 3 m (10'); a SNO-TEL station (snowpack recorder) is present. Summer rain is scarce.

The ULHC-RNA is is composed of granitic (ID Batholith) and gneissic rock types which have weathered into a coarse soil. Pleistocene mountain glaciation over-rode the area leaving various ice-carved features. Lost Horse Canyon is a U-shaped valley. Flat bench-like sites ccurrently support shallow ponds whose edges have deep organic deposits. Alpine larch is confined to coarse talus and boulder fields.

ECOLOGIC VALUES

The ULHC-RNA supports a number of forest habitat types each represented by various successional stages:

Pial/Laly	ht
Laly/Abla	ht
Abla/Xete	ht
Abla/Mefe	ht
Abla/Luhi	ht
Abla/Caru	ht
Abla/Vasc	ht
Abla/Caltha	ht

The SAF Cover Types present are:

208: Whitebark pine	(25% of RNA)
206: Spruce-fir	(45% of RNA)
218: Lodgepole pine	(15% of RNA)

These forest community types are arranged in a complex mosaic influenced by site topography, rockiness, and past fire. Such mixtures are typical in this part of the Bitterroot Mtns.

Major shrub species include: Vaccinium scoparium, V. globulare, Menziesia ferruginea, Spiraea betulifolia, S. densifolia, Sorbus spp., Alnus sinuata, Phyllodoce empetriformis, Ribes montigenium, Kalmia microphylla, Ledum glandulosum, Gaultheria humifusa, and Rhododendron albiflorum.

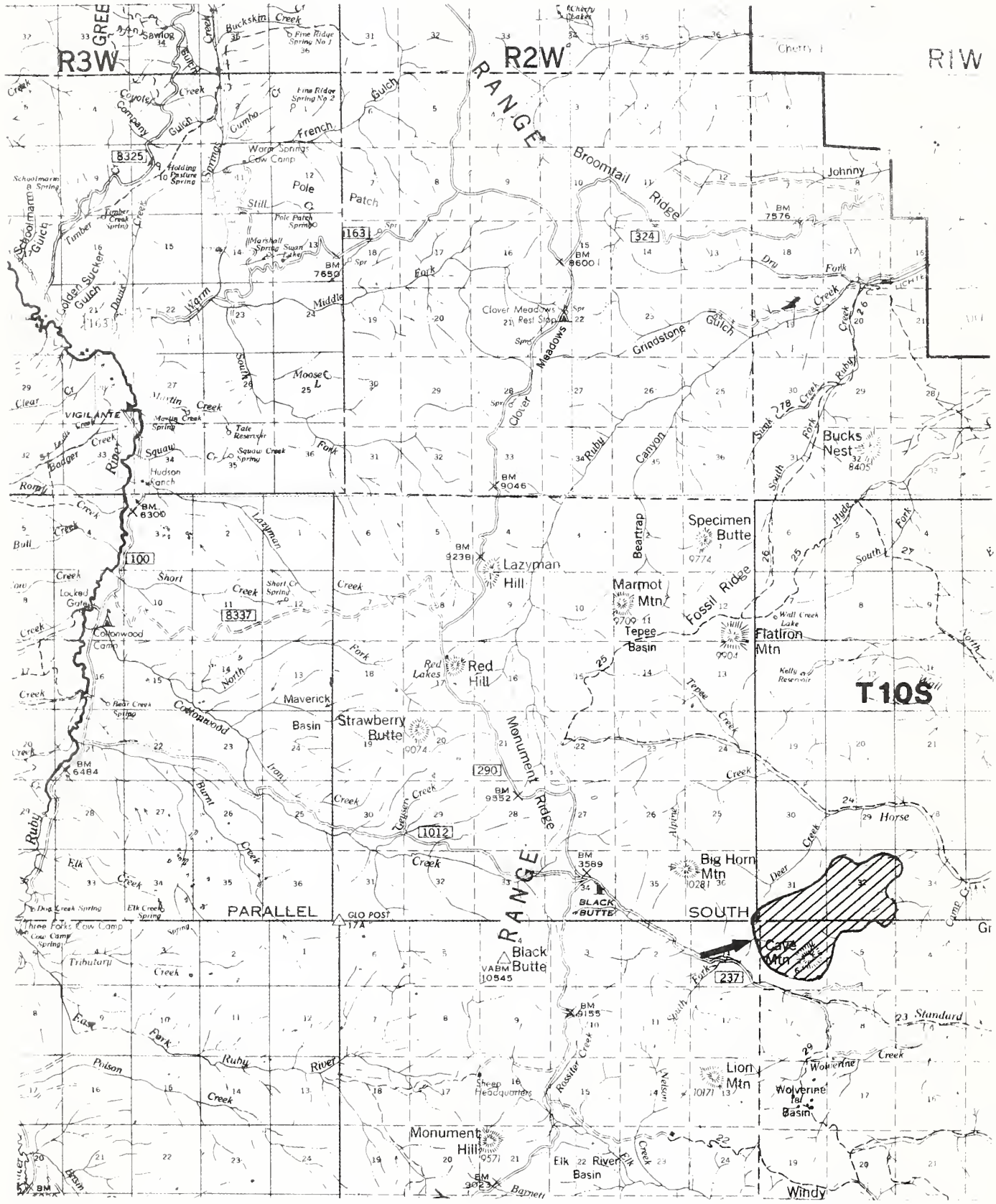
Groundlayer species include: Xerophyllum tenax, Penstemon lyallii, Silene acualis, Boykinia major, Ligusticum canbyi, Polygonum viviparum, P. bistortoides, Luzula spp., Carex rossii, Erigeron peregrinus, E. simplex, Tofieldia glutinosa, Tollius laxus, and Sibbaldia procumbens.

The ULHC-RNA supports the following vertebrates:

Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Mountain goat - Oreamnos americanus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Pika - Ochotona princeps
Y. marmot - Marmota flaviventris
Marten - Martes americana

Birds:
Ruffed grouse - Bonasa umbellus
Blue grouse - Dendragapus obscurus
Mtn bluebird - Sialia currucoides
D. woodpecker - Dendrocopos pubescens
C. nutcracker - Nucifraga columbia

CAVE MOUNTAIN PROPOSED RNA



44. CAVE MOUNTAIN PROPOSED

RESEARCH NATURAL

AREA

This RNA includes an alpine grassland dominated by Idaho fescue, with some forested terrain featuring a mixture of whitebark pine, subalpine fir, Engelmann spruce and Douglas-fir. Some sheep grazing occurred in the early part of the century, but is now relatively undisturbed. Iron ore exploration has taken place and some patented claims occur nearby.

****

The Cave Mtn. Research Natural Area (CM-RNA) is centrally located in the Gravelly Mountains of SW MT, occupying a high elevation plateau; elevations range from 2346 m (7740') to 2994 m (9880'). The CM-RNA covers a total of 729 ha (1800 acres). Steep rock escarpments, talus slopes and rock glaciers encircle Cave Mtn., named for two caves occurring on the plateau. The site is situated along a historical bighorn sheep migration route (exterminated in the 1920's). Domesticated sheep were introduced at the turn of the century, but grazing ceased in 1969. This early grazing was light due to the lack of stock water and a short snow-free season.

Vegetation cover is a mix of graminoids and forbs and may be better called a subalpine meadow. The occurrence of rhizomatous ID fescue is a special feature since it is typically a bunchgrass in this part of MT. Forests present are dominated by whitebark pine, subalpine fir, Engelmann spruce, and Douglas-fir.

Cave Mtn. RNA is located on the Madison District of the Beaverhead National Forest, Madison Co., MT: 44° 55' N. lat., 111° 46' W. long. The area is mapped within the USGS Monument Ridge and Cliff Lake Quadrangles, 15' series.

ACCESS AND ACCOMMODATIONS

The CM-RNA may be reached from the west side of the Gravelly Range, travelling south from Sheridan. Take State # 207 south 15 km (9 miles) to Alder, MT. Continue along Ruby River 33 km (20 miles) to Forest Road (FR) # 100. Follow this FR 17 km (10 miles), then FR # 1012 12 km (7 miles) to Beach Butte; take FR # 237 5 km (3 miles) to the Cave Mtn. Rd. Other acceptable routes originate from Ennis and Dillon, MT.

PHYSICAL AND CLIMATIC CONDITIONS

The Gravelly Range is between the Madison and Ruby River Valleys; the primary feature is the relatively flat, grass-covered summits. Alpine glaciation and erosion has produced this topography. Caves (sinkholes) result from solution activity in Madison limestone; snowmelt water promotes this through the summers.

The mountains in this part of MT experience a cold, dry continental climate; a coastal maritime influence is absent. Much of the precipitation occurs during the summer growing season, with peaks in May and June. Average annual moisture ranges from 60-90 cm (25-35"); snow depths may reach 500 cm (200") at the highest elevations.

ECOLOGIC VALUES

The following habitat types are found on the CM-RNA:

Psme/Feid	ht	[30 ha/ 75 acres]
Psme/Arco	ht	[54 ha/135 acres]
Abla/Rimo	ht	[59 ha/145 acres]
Abla-Pial/Vasc	ht	[34 ha/ 83 acres]
Pial-Abla	ht	[2 ha/ 5 acres]
Pial	ht	[69 ha/170 acres]
Feid/Deca	ht	[284 ha/700 acres]
Cliffs/Talus		[197 ha/487 acres]

The forests fit into the following SAF Cover Types:

206: Spruce-fir	[65 ha/ 160 acres]
208: Whitebark pine	[99 ha/ 243 acres]
210: Douglas-fir	[84 ha/ 210 acres]
Nonforest	[481 ha/1187 acres]

Major shrub species in CM-RNA are:

Dryas octopetala, Happlopappus suffruticosus, Potentilla fruticosa, Ribes montigenum, Salix nivalis, and S. wolfii.

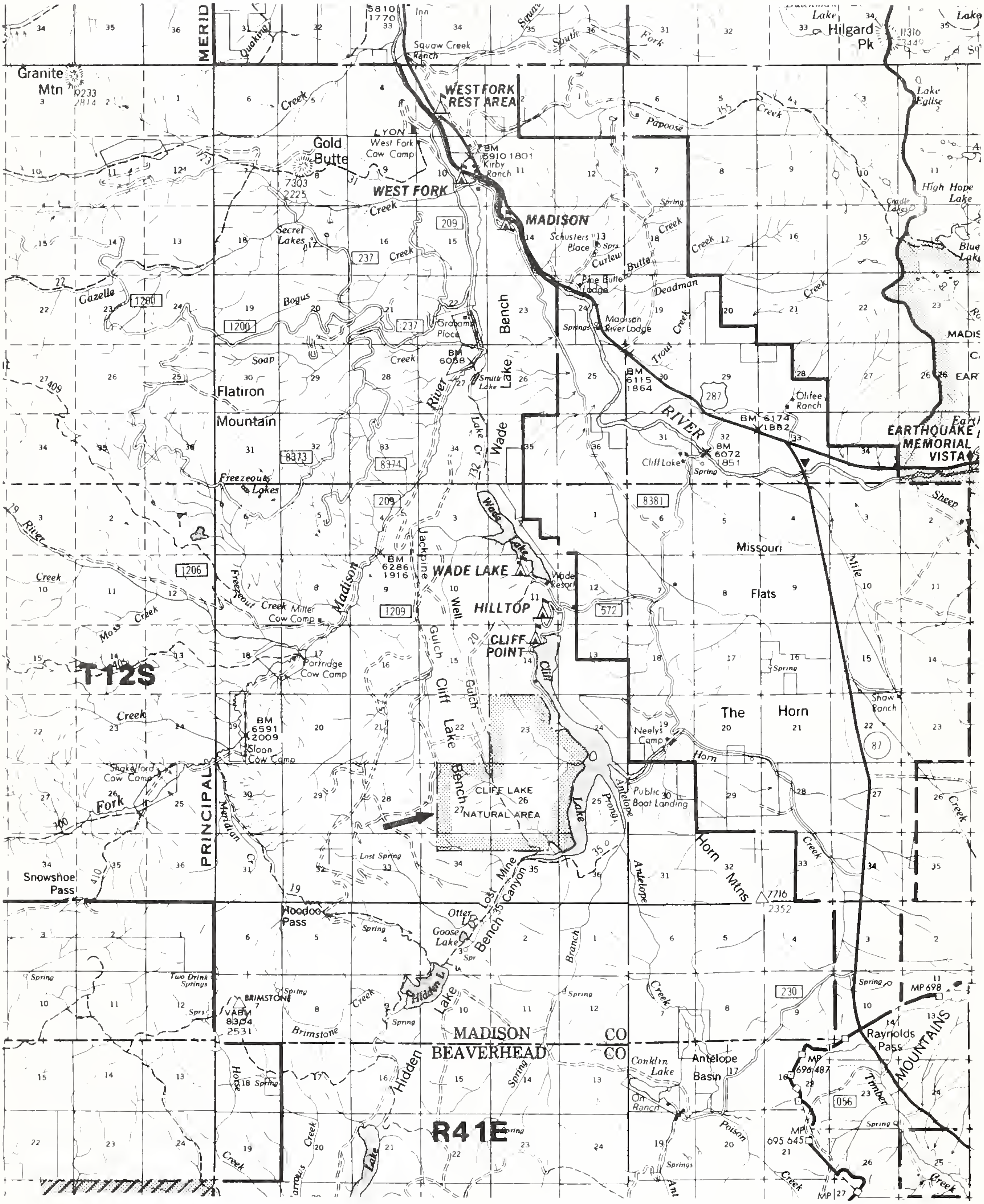
Representative grasses and forbs are:

Agropyron caninum, A. scribneri, Calamagrostis purpurascens, Festuca idahoensis, F. scabrella, Danthonia intermedia, Juncus parryi, Phleum alpinum, Poa alpina, Anemone spp., Arnica alpina, Douglasia montana, Erigeron compositus, Epilobium alpinum, Gentiana spp., Oxyria digyna, Lewisia pygmaea, Lloydia serotina, Pedicularis spp., Phlox spp., Saxifraga spp., Senecio fremontii, Sibbaldia procumbens and Townsendia montana.

Mammals that may use CM-RNA are:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Mountain lion - Felis concolor
Bobcat - Lynx rufus
H. marmot - Marmota flaviventris
Coyote - Canis latrans
Snowshoe hare - Lepus americanus

Birds utilizing this RNA include:
Common raven - Corvus corax
Magpie - Pica pica
Blue grouse - Dendragapus obscurus
Golden eagle - Aquila chrysaetos
Prairie falcon - Falco mexicanus
Horned lark - Eremophila alpestris
C. nutcracker - Nucifraga columbiana
Gray jay - Perisoreus canadensis

CLIFF LAKE RNA



45. CLIFF LAKE

RESEARCH NATURAL AREA

Located in SW MT, this RNA supports mature lodgepole pine and Douglas-fir (100-200 years old), as well as sagebrush shrub steppe and foothills prairie; Idaho fescue and sagebrush dominate the nonforest communities. Some spruce-fir and aspen forests are also present within this natural area.

****

The Cliff Lake Research Natural Area (CL-RNA) covers 928 ha (2291 acres); its eastern boundary is the west shore of Cliff Lake (although an overlap exists between the RNA and the Cliff/Wade Lakes Recreation Area); the lake level is 1913 m (6313'). The highest point within CL-RNA is at its western edge, 2272 m (7498'). The RNA consists of a high, undulating bench overlying Tertiary volcanics. Cliff Lake was formed by morainic accumulations.

About 58% of CL-RNA is forested; the vegetation is dominated by lodgepole pine and Douglas-fir, typical of the high continental divide region in this part of Montana. Engelmann spruce and subalpine fir are also present in small amounts on north- and east-facing slopes above 2182 m (7200'). Some aspen also occurs. Sagebrush-shrub steppe (Artemisia-Agropyron, Kuchler's Types # 49/55) and foothills prairie (Agropyron-Festuca-Stipa , Kuchler's Types # 56/63), compose the nonforested parts of CL-RNA.

The CL-RNA is located on the Madison District of the Beaverhead National Forest, Madison Co., MT: 44° 46' N. lat., 111° 30' W. long. The area is mapped within the USGS Cliff Lake Quadrangle, 15' series.

ACCESS AND ACCOMMODATIONS

The CL-RNA is located 42 km (25 miles) west of Yellowstone National Park, south central MT (67 km/40 miles by road W-NW of West Yellowstone, MT). Cliff Lake is reached from Hwy # 87 north of Raynolds Pass (ID/MT stateline). FR # 572 leads directly into the RNA site.

PHYSICAL AND CLIMATIC CONDITIONS

CL-RNA is located north of the Continental Divide. The area is somewhat protected from domestic use by the rugged topography and lack of stock water. The terrain is covered by Tertiary sediments. The area is subject to severe continental climate; summers are cool and the winters are long and cold. No climatic stations are present near CL-RNA, although West Yellowstone, MT is likely similar.

ECOLOGIC VALUES

The following forest habitat types are found in the CL-RNA:

Picea/Libo	ht	[184 ha/455 acres]
Psme/Caru	ht	[211 ha/520 acres]
Psme/Agsp	ht	[53 ha/130 acres]
Psme/Syor	ht	[" ha/ " acres]
Psme/Syal	ht	[26 ha/ 65 acres]
Abla/Vasc	ht	[53 ha/130 acres]
Aspen	ct	[13 ha/ 32 acres]

The forests fit into the following SAF Cover Types:

210: Douglas-fir	[310 ha/767 acres]
218: Lodgepole pine	[216 ha/533 acres]
217: Aspen	[13 ha/ 32 acres]

Major shrub species in CL-RNA are: Artemisia tridentata, Symphoricarpos oreophilus, S. albus, Linnaea borealis, Vaccinium scoparium, V. globulare, Spiraea betulifolia, Amelanchier alnifolia, Rosa acicularis, Pachistima myrsinites, Ribes lacustre, R. viscosissimum, Juniperus communis, and Arctostaphylos uva-ursi.

Representative groundlayer species: Arnica cordifolia, Aster conspicuus, Fragaria vesca, F. virginiana, Pyrola secunda, Festuca idahoensis, Antennaria racemosa, Geranium viscosissimum, Carex geyeri, Epilobium angustifolium, Calamagrostis rubescens, Chimaphila umbellata, Hedysarum occidentale, Erythronium grandiflorum, Thalictrum occidentale, and Campanula rotundifolia.

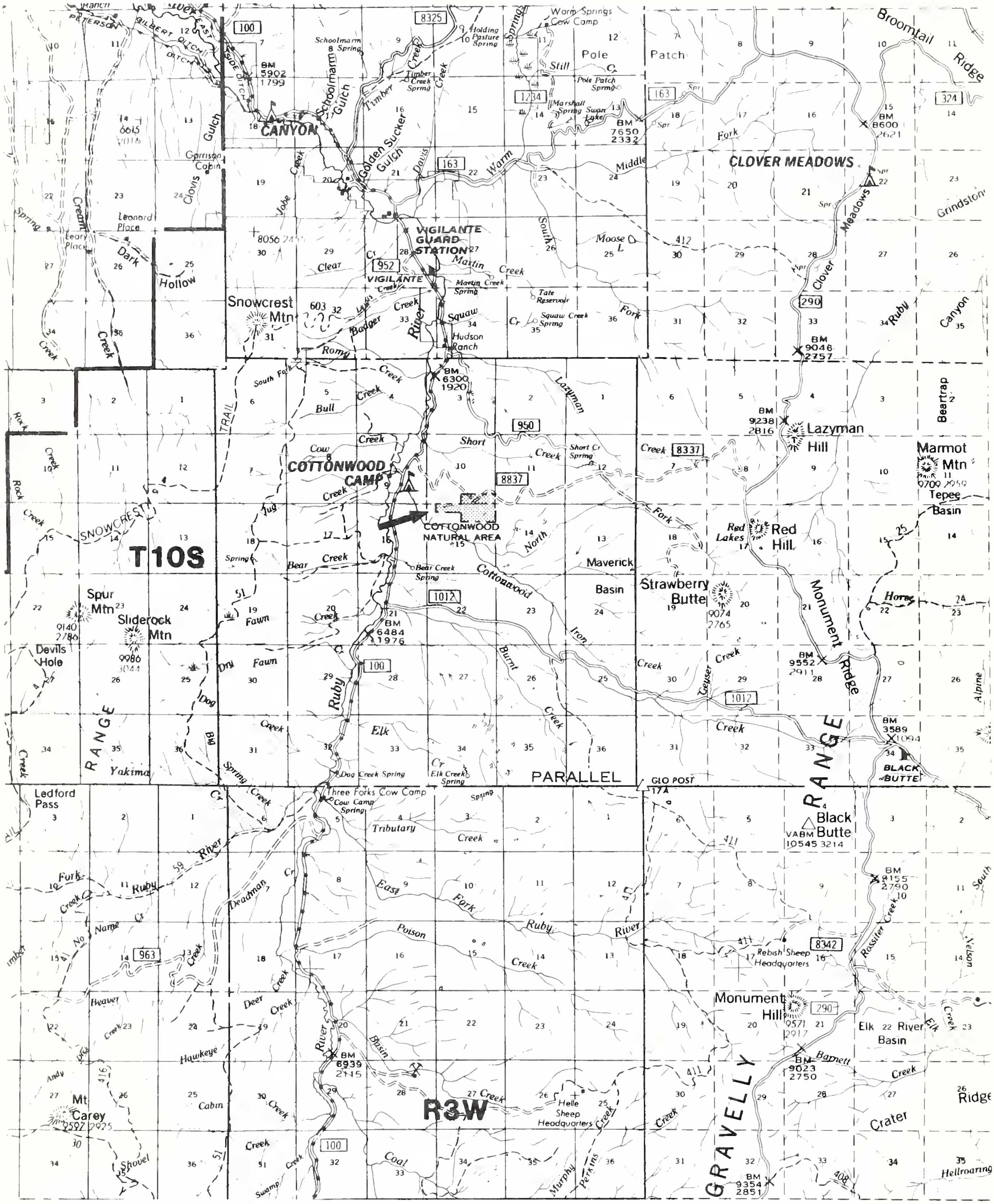
Mammals believed to be using the CL-RNA include:

- Moose - Alces alces
- Elk - Cervus canadensis
- Mule deer - Odocoileus hemionus
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Bobcat - Lynx rufus
- Y-b. marmot -Marmota flaviventris
- Snowshoe hare - Lepus americanus

Birds utilizing this RNA include:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites canadensis
- Redtailed hawk - Buteo jamaicensis
- Sandhill crane - Grus canadensis

COTTONWOOD CREEK RNA



46. COTTONWOOD CREEK

RESEARCH NATURAL

AREA

This RNA consists of a fenced exclosure system of high country ridges and dry slopes covered by Idaho fescue and bluebunch wheatgrass, as well as mesic sites supporting juniper and sagebrush and some Douglas-fir associations. The vegetation exists in a nearly unmodified, natural condition. Adjacent grasslands are incorporated into a pasture rest rotation grazing system.

****

The Cottonwood Ck Research Natural Area (CC-RNA) lies near the confluence of Cottonwood Creek with the Ruby River, east of the Ruby River Valley located between the Snowcrest and Gravelly Ranges in SW MT. It is fenced and encloses about 52 ha (128 acres). The xeric sites support Idaho fescue (Festuca idahoensis) and bluebunch wheatgrass (Pseudoroegneria spicata). More mesic sites support scattered Douglas-fir and limber pine; mixtures of Rocky Mountain juniper and big sagebrush (Artemisia tridentata) are also present. North slopes exhibit deep soils with sagebrush and wheatgrass.

Many of the Douglas-fir are stagnant and have heavy infestations of spruce budworm. The deterioration of the exclosure fencing (40 years old) along the upper boundary has allowed some trespass cattle grazing. The areas supporting sagebrush have canopy coverages ranging from 15-40%; a heavy grass cover exists beneath most of the sagebrush. They include: Kentucky bluegrass, (Poa pratensis), Idaho fescue, bluebunch wheatgrass, basin wildrye (Elymus cinereus), and Columbia needlegrass (Stipa columbiana). Grasses beneath the Douglas-fir include pinegrass (Calamagrostis rubescens) and basin wildrye.

Cottonwood Ck RNA is located on the Sheridan District of the Beaverhead National Forest, Madison Co., MT: 45° 00' N. lat., 112° 00' W. long. The area is mapped within the USGS Monument Ridge Quadrangle, 15' series.

ACCESS AND ACCOMMODATIONS

The CC-RNA may be reached from the Ruby River Valley on improved gravel roads; near Cottonwood Camp, a dirt road provides direct access to the northern boundary of CC-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

The CC-RNA consists of an east-west trending ridge. The lowest point, on Cottonwood Ck, is about 2000 m (6600'), while the highest point is about 2240 m (7400'). The xeric south face is steep, 45-60 percent, with thin soils. The nearly level north face has deeper soils and is more mesic.

Geologically this RNA rests on tilted, interbedded sandstones and shales. Differential weathering has resulted in sandstone ridges and eroded shale bed depressions.

The area experiences a typical continental climate: mean annual temperature is approximately 2.8° C (37° F), the mean low temperature occurs in Jan. at -9.4° C (15° F); the warmest month is July: 16° C (60° F). Average annual precipitation is 45 cm (18"); approximately 40% of this total falls in the form of snow. Mean annual snow pack is 45 cm (18").

ECOLOGIC VALUES

Of the 52 ha (128 acres) composing CC-RNA, only about 8 ha (20 acres) have any sort of timber cover; the remainder is grassland and sagebrush. Forest habitat types include:

Psme/Caru	ht	[8 ha/20 acres]
Juniperus	ht	[" "]
Feid/Agsp	ht	[19 ha/46 acres]
Artr/Feid	ht	[22 ha/54 acres]
Barren		[3 ha/ 8 acres]

The forests fit into the following SAF Cover Types:

210	Douglas-fir	[8 ha/20 acres]
220	Juniper	[" ha/ " acres]

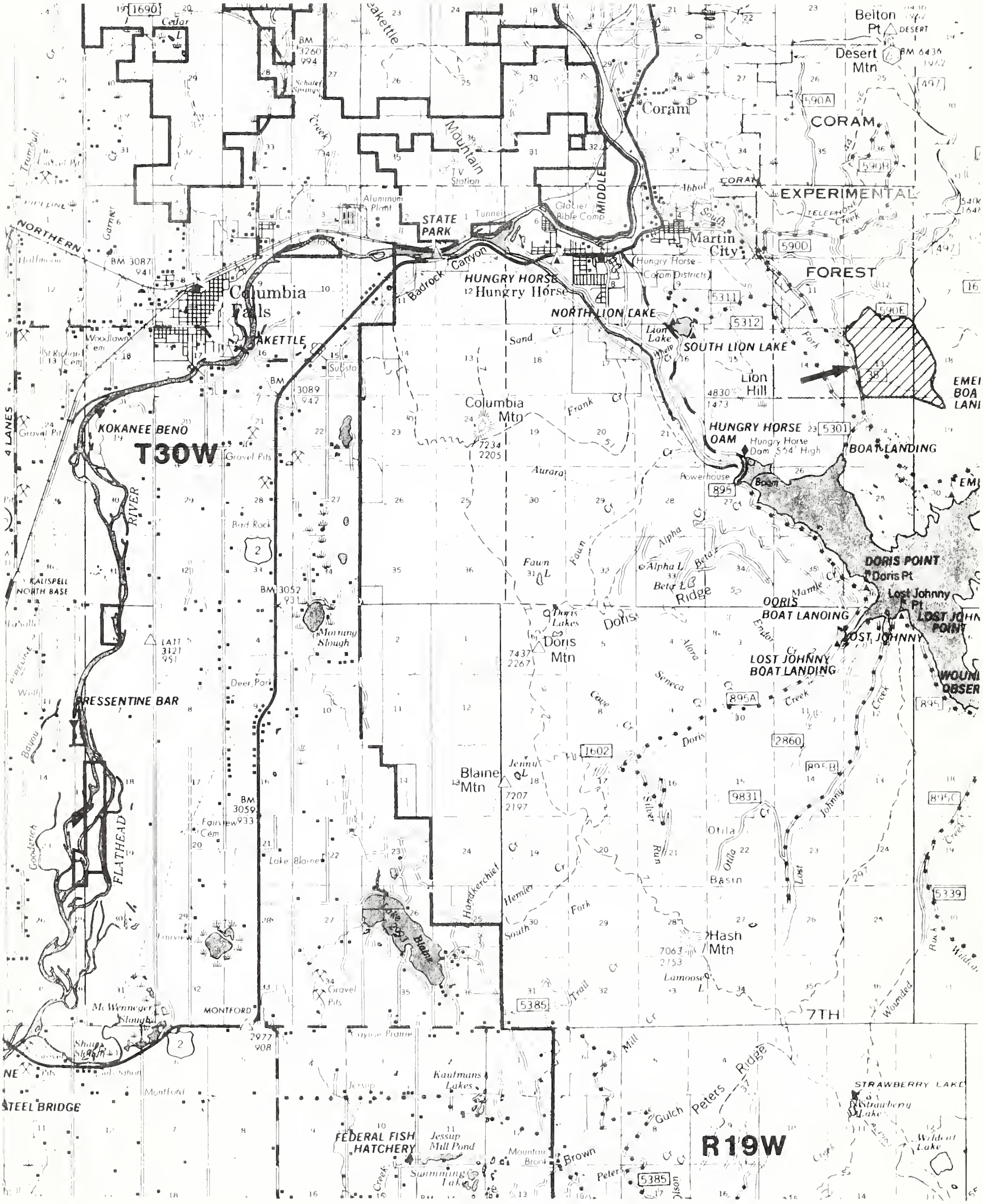
Shrub species in CC-RNA are: Artemisia tridentata, Rosa acicularis, Eleagnus commutatus and Symphoricarpos oreophilus.

Representative grasses and forbs: Pseudoroegneria spicata, Festuca idahoensis, Calamagrostis rubescens, Poa pratensis, Elymus cinereus, and Stipa columbiana.

Mammals believed to use CC-RNA:
- Elk - Cervus canadensis
- Mule deer - Odocoileus hemionus
- Mountain lion - Felis concolor
- Bobcat - Lynx rufus
- Coyote - Canis latrans
- W-t. jackrabbit - Lepus townsendi

Birds utilizing this RNA include:
- Common raven - Corvus corax
- Blue Grouse - Dendragapus obscurus
- Ruffed Grouse - Bonasa umbellus
- Sage Grouse - Centrocercus urophasianus

CORAM PROPOSED RNA



47. CORAM PROPOSED RESEARCH NATURAL AREA

Coram RNA serves as the control for manipulative research conducted in the Coram Experimental Forest, located in northwestern MT near Glacier Park. The area features 300-year-old western larch and Douglas-fir, with seral communities dominated by western white pine, lodgepole pine, and ponderosa pine. Engelmann spruce-subalpine fir and western redcedar-western hemlock stands are also present.

****

The Coram Research Natural Area (C-RNA), also referred to as the Coram Experimental Forest RNA, covers 340 ha (839 acres) within the larger (3019 ha/7460 acres) Coram Experimental Forest, which was established in 1933, and is a component of the International Man and the Biosphere (MAB) Biosphere Reserve network.

The lowest elevation within C-RNA is 1060 m (3500'), the highest (Desert Mountain) is 1440 m (4750'). Old growth forests dominated by western larch and Douglas-fir occupy 75% of the entire RNA. Old growth Douglas-fir, by itself, covers 20%. The mature western white pine type, which includes western redcedar and western hemlock, covers only 2% of the C-RNA, but much of this is easily accessible. Past fires in the C-RNA generated the present-day dominance of larch; modern fires have been suppressed from the area. A complete fire history has been compiled for the C-RNA. Some of the area's larch are about 500 years old.

None of the C-RNA has been logged. In 1984, a series of permanent baseline monitoring plots were installed in the C-RNA; data on trees, shrubs, and herbs were compiled from releves. Records are maintained in the District, Forest, R-1, and INT (Missoula) Offices. The C-RNA is located on the Hungry Horse District, Flathead National Forest, Flathead Co., MT: 48° 22' N. lat., 113° 58' W. long. The area is mapped within the USGS West Glacier and Nyack Southwest Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The C-RNA is located at the southern end of the Coram Experimental Forest. It is 45 km (28 miles) east of Kalispell, MT via Hwy # 2, and 3 km (2 miles) south of Martin City, via the South Fork Rd # 38. This latter road forms the west boundary of C-RNA. Near the northeastern boundary an Experimental Forest road also provides access to the northern parts of C-RNA. Camping is available at nearby Hungry Horse Reservoir or in other FS campgrounds.

PHYSICAL AND CLIMATIC CONDITIONS

C-RNA is located near the southwestern corner of Glacier Park and has similar physical and climatic features. The mountain slopes are moderately steep; bedrock consists of argillites, quartzite,and impure limestone. The lower two-thirds has heavy glacial till deposits. The soils are brown podzolics. The C-RNA gives rise to two branches of the South Fork of Abbott Creek.

The nearest climate station is at Hungry Horse Dam. Annual precipitation averages 79 cm (31") at the lower elevations. Mean temperatures are about 16° C (60° F); August highs occasionally reach 38° C (100° F) while midwinter temperatures average -7° C (20° F), but dipping to -29° C (-20° F).

ECOLOGIC VALUES

The following forest habitat types are found on the C-RNA:

Psme/Phma	ht	[130 ha/322 acres]
Abla/Clun	ht	[209 ha/517 acres]

The forests fit into the following SAF Cover Types:

210: Douglas-fir	[71 ha/175 acres]
212: W.larch/D.-fir	[245 ha/605 acres]
206: Spruce-fir	[3 ha/ 8 acres]
227: Cedar-hemlock	[8 ha/ 21 acres]

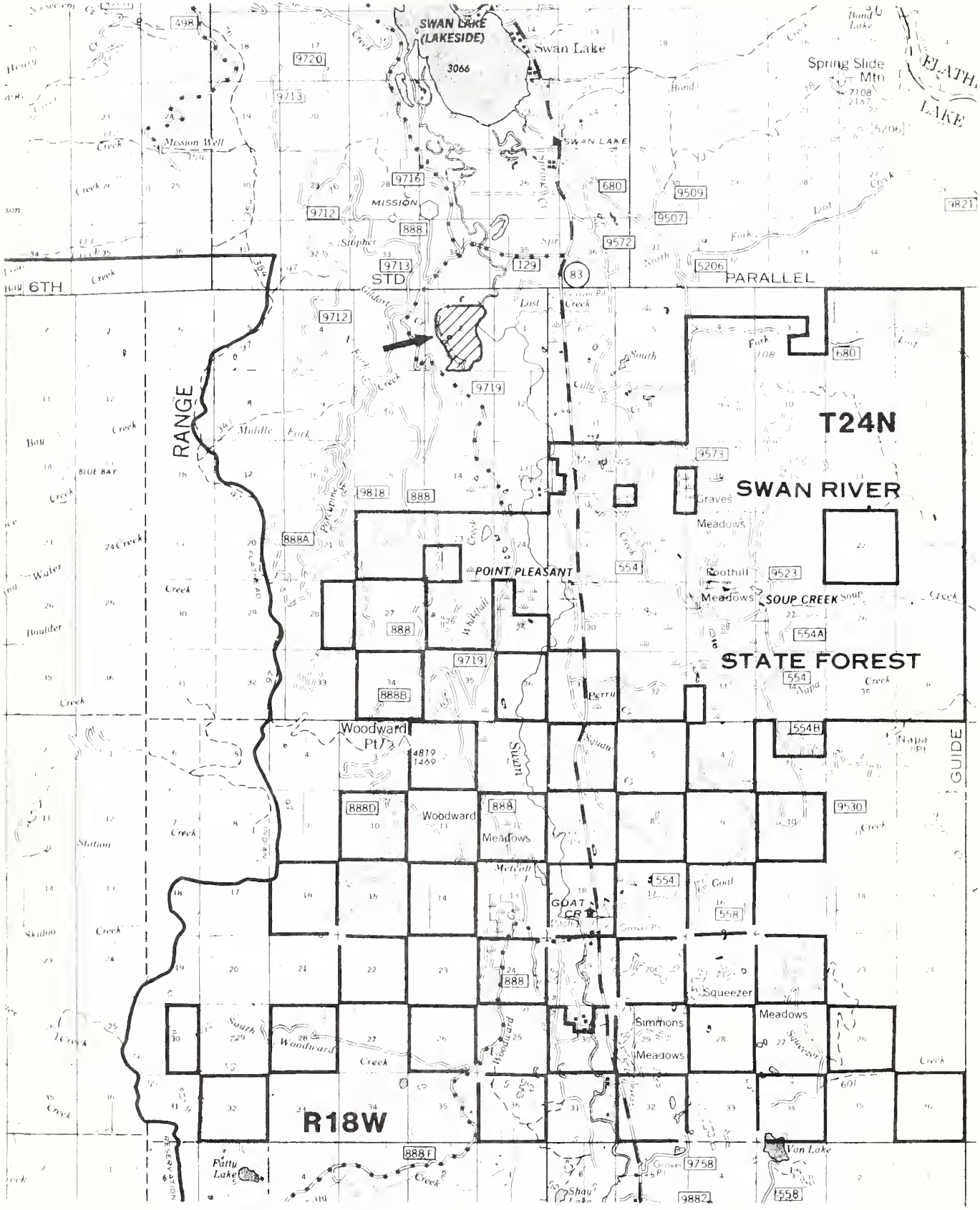
Major shrub species in C-RNA are: Amelanchier alnifolia, Berberis repens, Acer glabrum, Cornus stolonifera, Holodiscus discolor, Lonicera utahensis, Physocarpus malvaceus, Rosa gymnocarpa, Ribes lacustre, Rubus parviflorus, Spiraea betulifolia, Symphoricarpos albus, Taxus brevifolia, Pachistima myrsinites, and Vaccinium globulare.

Representative groundlayer species: Athyrium filix-femina, Actaea rubra, Arnica cordifolia, Clintonia uniflora, Chimaphila umbellata, Disporum hookeri, Galium triflorum, Smilacina stellata, S. racemosa, Osmorhiza occidentalis, Thalictrum occidentale, and Pyrola asarifolia.

Mammals using the C-RNA include:
- Moose - Alces alces
- Elk - Cervus canadensis
- Mule deer - Odocoileus hemionus
- White-tailed deer - O. virginianus
- Black bear - Ursus americanus
- Porcupine - Erethizon dorsatum
- Snowshoe hare - Lepus americanus

Birds utilizing C-RNA include:
- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites
- Golden eagle - Aquila chrysaetos

SWAN RIVER PROPOSED RNA



48. SWAN RIVER PROPOSED

RESEARCH NATURAL

AREA

This RNA features upland forests in a maritime influence zone in NW MT, dominated by grand fir, western redcedar and western yew, plus fire-generated stands of western larch, lodgepole pine, and western white pine. Equal amount of area is open water, marshlands, and flooded forests; beaver activity is present.

****

The Swan River Research Natural Area (SR-RNA) covers 123 ha (304 acres) within the moist forest zone (939 m/3100') of northwestern Montana. The area occupies the lowest position in the lower Swan River Valley. A well-drained central upland portion of the SR-RNA supports a fire-generated mosaic of western larch, lodgepole pine, western white pine and Douglas-fir. Present in low, moist sites are western redcedar, grand fir, and western yew; the grand fir is the potential climax on most of the upland terrain.

The SR-RNA is located on the Swan Lake District of the Flathead National Forest, Lake Co., MT: 47° 50' N. lat., 113° 50' W. long. It is mapped on the Cilly Creek Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

SR-RNA is located 7 km (4 miles) south of Swan Lake, MT. From that point take Hwy # 83 south to intersection with FR # 129; travel west to intersect FR # 9719; proceed on FR # 9719 for 4 km (2.5 miles) beyond this junction. Enter SR-RNA by hiking eastward; Porcupine Ck may also be followed to enter at a central point, which avoids traversing wetland terrain. An undeveloped campsite exists at the intersection of Swan River and Rd # 129.

PHYSICAL AND CLIMATIC CONDITIONS

SR-RNA occupies a trench bounded by parallel mountain ranges (Mission and Swan Ranges). Swan River forms the eastern boundary and flows north to Swan Lake. The entire area was glaciated. The lower Swan Valley is under strong Pacific maritime influence. Swan Lake, MT climate data: total annual precipitation averages 75 cm (30"), with moist summers and deep winter snowpacks; July averages 16.9°C (62° F) and Jan. mean is -5.1° C (23° F).

The SR-RNA exhibits low vertical relief: 939 to 970 m (3100' to 3200'). The uplands soils are derived from glacial till, which is primarily calcareous (limestone), plus a cap of volcanic ash. Soils are relatively immature. The grand fir forests in the area exhibit a superficial mor humus layer, 2-6 cm (1-2").

ECOLOGIC VALUES

The following forest habitat types are present:

Abgr/Clun	ht	[43 ha/106 acres]
Thpl/Clun	ht	[22 ha/ 55 acres]
Picea/Clun	ht	[9 ha/ 21 acres]

The SAF Cover Types present are:

212: Western larch	[40 ha/ 99 acres]
213: Grand fir	[10 ha/ 25 acres]
228: W. redcedar	[10 ha/ 25 acres]
206: Spruce-fir	[9 ha/ 21 acres]
218: Lodgepole	[5 ha/ 12 acres]

There are 49 ha (122 acres) of non-forested, wetland vegetation in the SR-RNA.

The major shrub species found in the SR-RNA are:
Acer glabrum, Alnus sinuata, Amelanchier alnifolia, Berberis repens, Cornus stolonifera, Holodiscus discolor, Juniperus communis, Lonicera ciliosa, L. utahensis, Menziesia ferruginea, Oplopanax horridum, Pachistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, Spiraea betulifolia, Symphoricarpos albus, and Vaccinium globulare.

Understory dominants include:
Adenocaulon bicolor, Aralia nudicaulis, Arnica cordifolia, Chimaphila umbellata, Clintonia uniflora, Cornus canadensis, Galium triflorum, Gymocarpium dryopteris, Linnaea borealis, Lycopodium annotinum, Tiarella trifoliata, Veratrum viride, and Xerophyllum tenax.

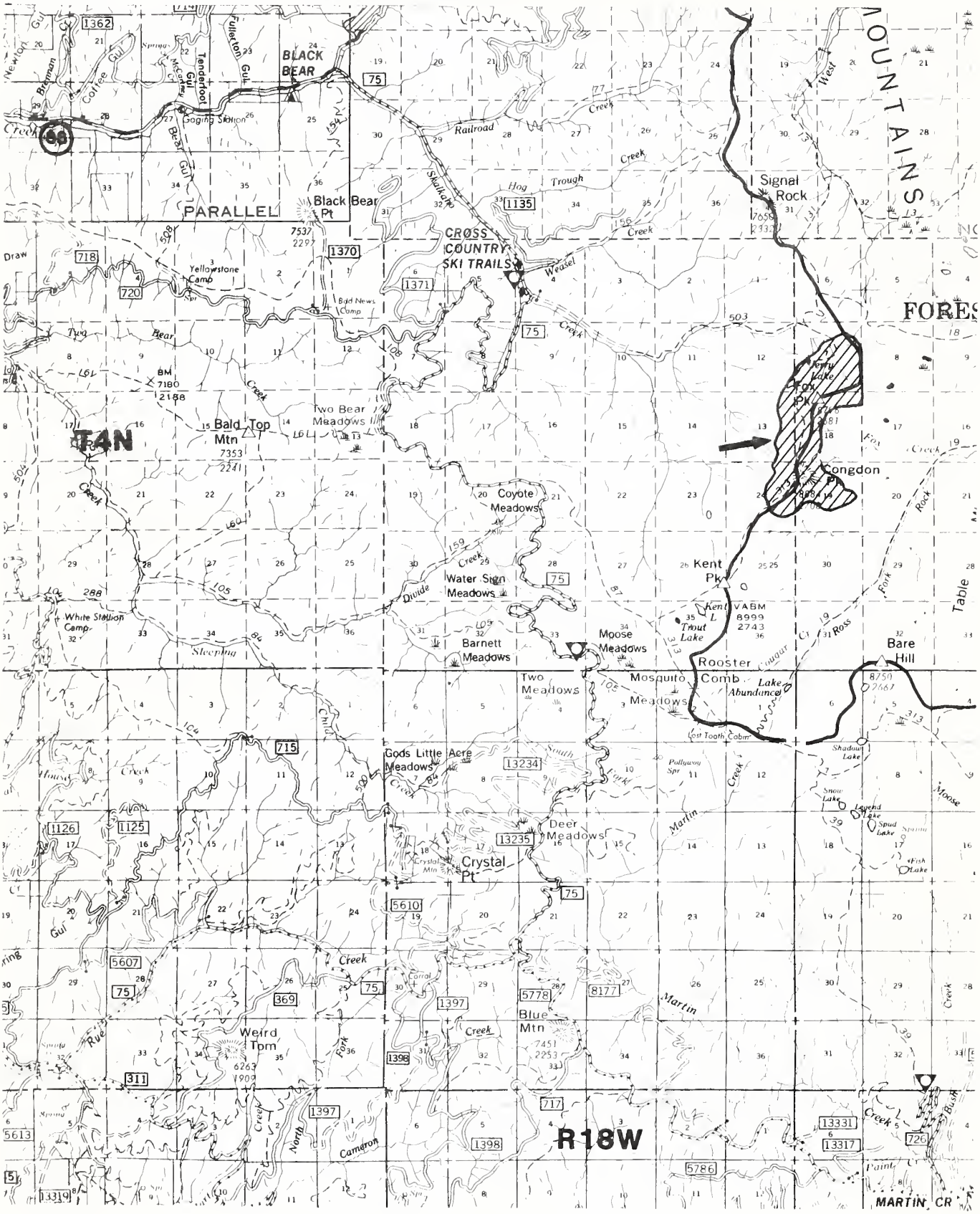
Wetland genera include:
Equisetum, Isoetes, Azolla, Callitriche, Ceratophyllum, Bidens, Rorippa, Myriophyllum, Utricularia, Menyanthes, Nuphar, Mimulus, Sium, Alisma, Sagittaria, Acorus, Lysichitum, Beckmannia, Juncus, Najas, Potamogeton, Sparganium and Typha.

Mammals include:

Moose - Alces alces
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Grizzly bear - U. arctos
Mountain lion - Felis concolor
Coyote - Canis latrans
Lynx - Lynx canadensis

Bird species: Eighty-four birds have been inventoried on the SR-RNA; these include 3 species of grouse, 10-12 migratory ducks, 5 hawks, 3 owls, 2 eagle species, 5-6 woodpeckers, and numerous small songbirds (warblers, kinglets, thrush, swallows, hummingbird, finches, juncos, sparrows, etc.).

SAPPHIRE DIVIDE PROPOSED RNA



49. SAPPHIRE DIVIDE PROPOSED

RESEARCH NATURAL

AREA

This RNA supports an excellent population of alpine larch within a high, rugged mountain setting in western Montana. Other associated conifers are whitebark pine, subalpine fir, Engelmann spruce, and lodgepole pine. Several small grassland balds and a small subalpine, cirque lake are also present within this natural area.

****

The Sapphire Divide Research Natural Area (SD-RNA) features a representative assortment of alpine larch forest communities occupying various topographic situations. The SD-RNA occupies 445 ha (1100 acres) all of it above 2300 m (7500'), and located in the southern Sapphire Mountains. The alpine larch forms some stands by itself, but mixes elsewhere with whitebark pine, Engelmann spruce, and subalpine fir. The highest elevations within the SD-RNA are two points: Congdon Peak (2692 m/8884') and Fox Peak (2665 m/8796'). Within the boundaries of the SD-RNA the alpine larch displays some growth-form variations, ranging from single erect stem types in protected sites, to shorter multi-stemmed on the higher exposed sites. The area receives light human use in the form of summer hikers and fall season hunters. No domestic grazing activity has occurred in this area.

The SD-RNA is located partially on the Bitterroot National Forest, Ravalli Co., and the remainder on the Deerlodge National Forest, Granite Co., MT: 46° 5' N. lat., 113° 46' W. long. The area is mapped within the Kent Peak and Whetstone Ridge USGS Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The SD-RNA is reached only by a Forest Service trail system. The trailheads are reached from the Skalkaho-Rye Rd # 75 about 8 km (5 miles) from the Black Bear Campground on Hwy # 38, to Skalkaho Ck. Trail # 503 follows this Creek eastward 6 km (4 miles), then intersects Trail # 313 in the NE corner of the SD-RNA. Trail # 313 runs the north-south length of the SD-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

This part of the Sapphire Mountains is composed of Precambrian rocks 1.5 billion years old; they are sandstone, shale, and limestone. The mountains resulted from faulting, folding, and volcanic intrusion. Pleistocene glaciation scoured the area forming steep, rocky cirque walls.

Much of the area is subject to frost churning; the cirque basin soils are gravelly or cobbly with slope gradients of 70-90 %. The climate is cold and wet; average annual temperature is about 4°C (35°F); 75-125 cm (30-50") of annual precipitation, 60-80 % of this in the form of snow. Snow depths are recorded at Skalkaho Pass (2199 m/7258').

ECOLOGIC VALUES

The following forest habitat types are found on the SD-RNA:

Abla/Luhi	ht	[223 ha/550 acres]
Pial	ht	[107 ha/265 acres]
Laly/Abla	ht	[81 ha/201 acres]
Pial/Abla	ht	[12 ha/ 30 acres]
Talus/Rockland		[21 ha/ 51 acres]
Cirque Lake		[1 ha/ 3 acres]

The forests fit into the following SAF Types:

206: Spruce-Fir	[223 ha/550 acres]
208: Whitebark pine	[200 ha/496 acres]

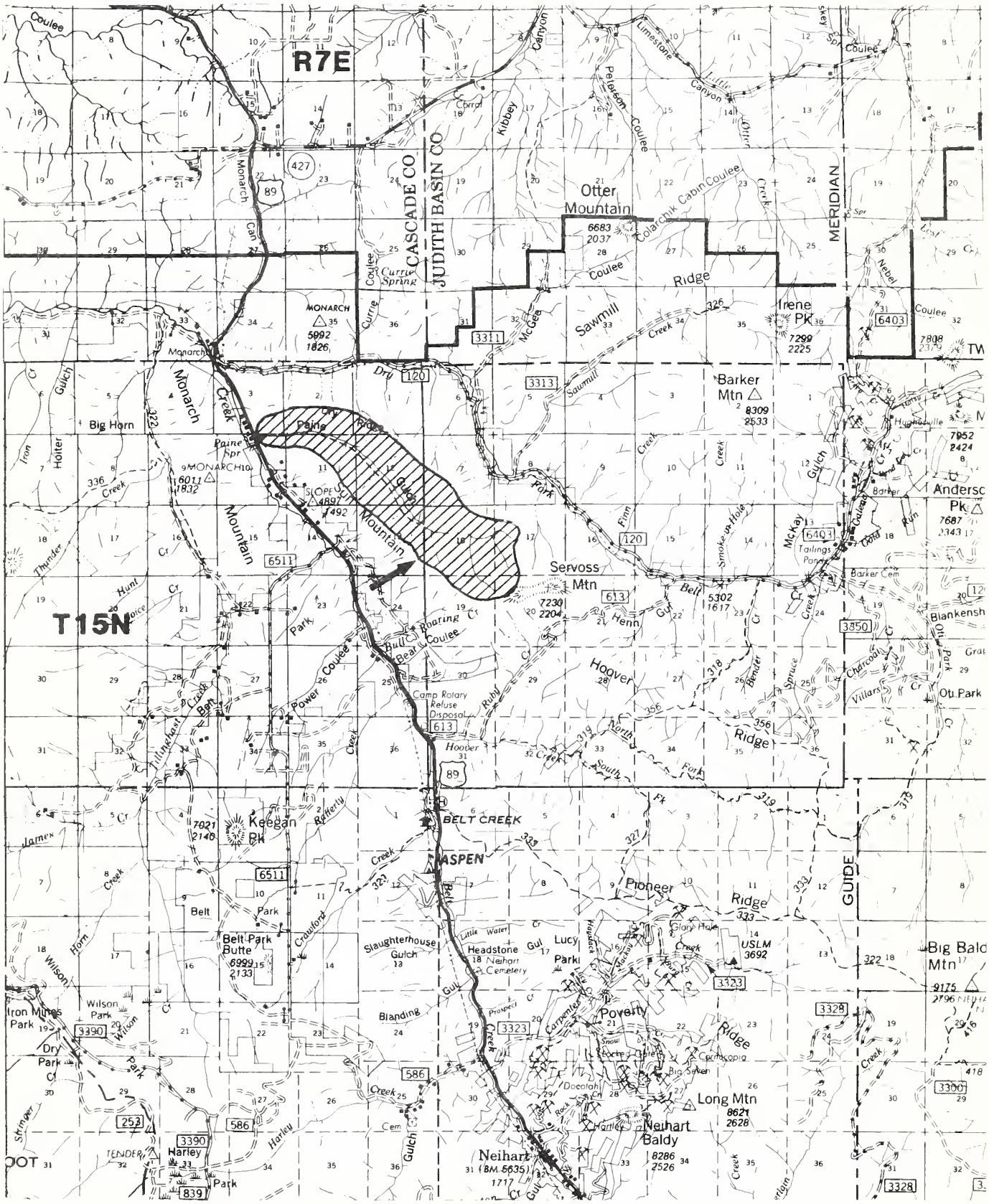
Major shrub species in SD-RNA are: Gaultheria humifusa, Juniperus communis, Ledum glandulosum, Menziesia ferruginea, Phyllodoce empetriformis, Rhododendron albiflorum, Ribes montigenum, Symphoricarpos oreophilus, and Vaccinium scoparium.

Representative groundlayer species: Carex geyeri, C. nigricans, C. rossi, Luzula hitchcockii, Festuca ovina, Claytonia lanceolata, Epilobium alpinum, Mimulus lewisii, Oxyria digyna, Xerophyllum tenax, Saxifraga arguta, Erythronium grandiflorum, Sibbaldia procumbens, and Veratrum viride.

Mammals using the SD-RNA include:
- Elk - Cervus canadensis
- W.t. deer - Odocoileus virginianus
- Black bear - Ursus americanus
- Bobcat - Lynx rufus
- Pika - Ochotona princeps
- Y.b. marmot - Marmota flaviventris
- Snowshoe Hare - Lepus americanus
- Coyote - Canis latrans

Birds utilizing this RNA include:
- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- C. Nutcracker - Nucifraga columbiana
- Mtn. chickadee - Parus gambeli
- Pine grosbeak - Pinicola enucleator
- Pine siskin - Spinus pinus

PAINE GULCH PROPOSED RNA



50. PAINE GULCH PROPOSED

RESEARCH NATURAL

AREA

Located in the Little Belt Mountains of eastern MT, this 1012 ha (2500 acres) RNA supports forests dominated by Douglas-fir, limber pine, and lodgepole pine; limestone substrates are featured. Both montane and subalpine meadows are present are as seeps, springs, and sinkholes; the main drainage system flows beneath the surface.

****

The Paine Gulch Research Natural Area (PG-RNA) displays an elevational gradient extending from 1418 m (4680') at its mouth, to 2186 m (7213') near Servoss Mountain. The gulch is steep-sided, with a vertical displacement of over 300 m on either side of the gulch. Ribbons of forest are aligned along horizontal beds of limestone. Douglas-fir dominates both slopes; limber pine joins Douglas-fir north-facing slopes, with ponderosa pine joining these on lower slope sites. A 1919 fire fostered ponderosa pine dominance on some warm, dry south-facing slopes of Paine Gulch.

Douglas-fir and limber pine are combined with lodgepole pine (Pinus contorta) on upper north slopes. Some subalpine fir (Abies lasiocarpa) is found on the highest ridges, but this species is still mixed with Douglas-fir on the calcareous soils. The lowest drainage sites, as well as the more moist upper elevations support grassland meadows; higher ones are fescue-dominated.

The PG-RNA is located on the Belt Creek District of the Lewis and Clark National Forest, Cascade Co., MT: 47° 05' N. lat., 110° 47' W. long. The area is mapped within the USGS Monarch and Barker Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

The PG-RNA is located 75 km southeast of Great Falls, MT; access is via hwy # 89 just south (2.5 km/2 miles) of the town of Monarch. A former logging access road extends into Paine Gulch 3/4's of its length; the first segment, however, is in private ownership and must be skirted to reach federal lands. The upper reaches of PG-RNA, near Servoss Mtn., may be reached via the Hoover Ck Rd # 613 which enters the area 10 km (6 miles) south of Monarch.

PHYSICAL AND CLIMATIC CONDITIONS

PG-RNA is located in the Little Belt Mountains, a folded, arched, system of Precambrian sedimentary mudstones. The area overlies Mississippian limestone. Both the topsoils and subsoils are alkaline. Some parts of PG-RNA wind deposited silt. Rotational slumping of hard bedrock has occurred as has glacial scouring.

The nearest climate station is at Neihardt, MT (110° 47' W. long.), at 1585 m (5230'). Mean annual temperature is 4° C (40° F), with July averaging 16°C (61° F) and Jan. -7° C (20° F). Annual precipitation at Neihardt is 52 cm (21"), 60% coming between May and Sept.

ECOLOGIC VALUES

The following forest series and habitat types are found on the PG-RNA:

Pipo Series:	
Pipo/Syal ht	[73 ha/180 acres]
Pipo/Feid ht	[mixed together]
Psme Series:	[454 ha/1120 acres]
Psme/Scree ht	[47 ha/ 116 acres]
Abla Series:	[70 ha/ 174 acres]
Pifl Series:	[197 ha/ 486 acres]
Pifl/Scree ht	[19 ha/ 48 acres]
Fesc/Feid ht	[2 ha/ 5 acres]
Lower meadow	[19 ha/ 46 acres]

The forests fit into the following SAF Cover Types:

237: Ponderosa pine	[73 ha/ 180 acres]
210: Douglas-fir	[534 ha/1319 acres]
218: Lodgepole pine	[168 ha/ 416 acres]
219: Limber pine	[216 ha/ 534 acres]

Major shrub species in PG-RNA are: Amelanchier alnifolia, Berberis repens, Acer glabrum, Cornus stolonifera, Betula occidentalis, Juniperus communis, Potentilla fruticosa, Rosa acicularis, Rhus trilobata, Prunus virginiana, Ribes lacustre, Rubus idaeus, Salix scouleriana, Shepherdia canadensis, Spiraea betulifolia, Symphoricarpos albus, and Vaccinium scoparium.

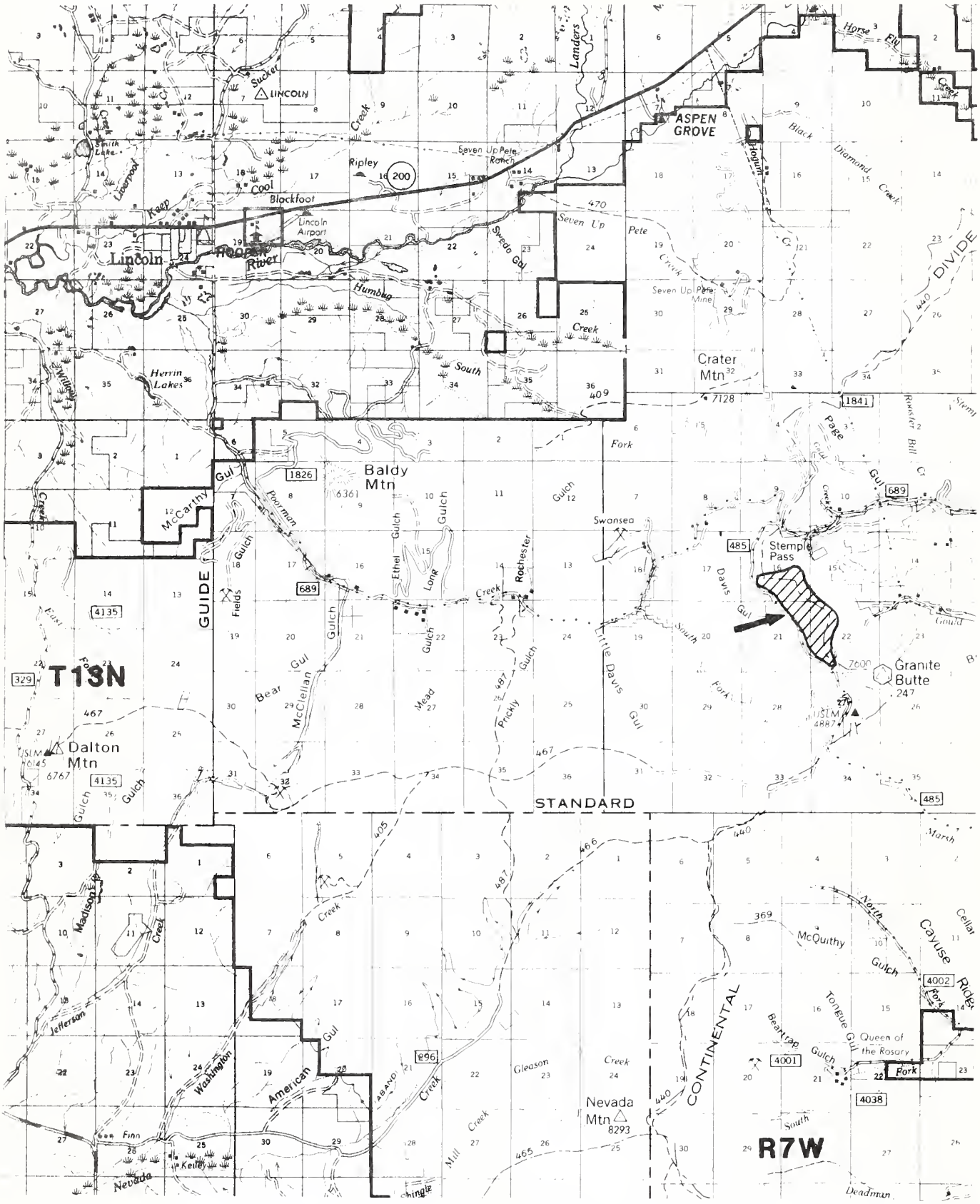
Representative groundlayer species:

Achillea millefolium, Actaea rubra, Pseudoroegneria spicata, Festuca idahoensis, F. scabrella, Carex geyeri, Calamagrostis candensis, Chimaphila umbellata, Heuchera cylindrica, Fritillaria pudica, Zygadenus elegans, Smilacina stellata, Erythronium grandiflorum, Thalictrum occidentale, and Pyrola secunda.

Mammals using the PG-RNA include:
- Moose - Alces alces
- Elk - Cervus canadensis
- Mule deer - Odocoileus hemionus
- Black bear - Ursus americanus
- Mountain lion - Felis concolor
- Bobcat - Lynx rufus
- Y.b. marmot -Marmota flaviventris
- Porcupine - Erethizon dorsatum
- Striped skunk - Mephitis mephitis
- Snowshoe hare - Lepus americanus

Birds utilizing this RNA include:
- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- Spruce grouse - Canachites spp.
- Golden eagle - Aquila chrysaetos

GRANITE BUTTE PROPOSED RNA



51. GRANITE BUTTE PROPOSED

RESEARCH NATURAL

AREA

This RNA is composed of mountain fescue grasslands and adjacent subalpine fir forests located on the MT Continental Divide, 2100 m (7000'). Rough fescue and Idaho fescue dominate, together with lodgepole pine, whitebark pine, and subalpine fir which forms snow glade and ribbon forest communities.

****

The 165 ha (408 acres) Granite Butte Research Natural Area (GB-RNA) includes representative mountain grasslands that exhibit recovery from early sheep grazing. Composing the grassland types are habitat types (Mueggler and Stewert, 1980) dominated by rough fescue (Festuca scabrella) and Idaho fescue (F. idahoensis); bluebunch wheatgrass (Pseudoroegneria spicata) is an associate. Whitebark pine forms elongated stringer or "ribbon" forests adjacent to sites where 5-10 m (15-30') wind-deposited snow drifts form each winter just east of the Divide. Down slope from the grasslands are old growth subalpine fir and lodgepole pine. Douglas-fir is also present.

The GB-RNA is located on the Lincoln District of the Lewis and Clark Forest, Lewis and Clark Co., MT; 46° 52' N. lat., 112° 30' W. long. It is covered, in part, on the Stemple Pass, Granite Butte, Swede Gulch, and Nevada Mtn Quadrangles, 7.5' series. GB-RNA is bounded on the east by a line just east of the Continental Divide, and FR # 485 on the west.

ACCESS AND ACCOMMODATIONS

Granite Butte RNA may be reached from the west from Lincoln, MT (Hwy # 200) following the Stemple Pass Rd to the Continental Divide where the access road to Granite Butte Lookout provides direct access to the entire west boundary. A 4-wheel track follows the Divide crest on the southern half of the GB-RNA. Some tracks dating back to mineral prospecting activity also serve the area. Travel to GB-RNA may also originate from Helena and Canyon Creek approaching Stemple Pass from the east. There are no nearby developed campgrounds, although vehicular camping is easily accommodated.

PHYSICAL AND CLIMATIC CONDITIONS

Two ecological land units (ELUs) are present as described in the unit planning report: ELU-1 grassland community and ELU-20 subalpine fir forest. Both ELU's have sedimentary rocks dominating, featuring calcareous shales, quartzites, and argillites. GB-RNA is specifically underlain by laminated Helena limestone.

Local mineral extraction is from the Boulder Batholith, but this does not occur within the GB-RNA. Soils consist of deep loams or clay loams on both ELU-1 and ELU-20.

A cool, moist (summer dry) climate prevails; 50-75 cm (20-30") annual precipitation, with 60% as snow. Wind deposition of snow creates deep drifts that persist into midsummer (snow glades).

ECOLOGIC VALUES

The GB-RNA exhibits the following grassland and forest habitat types:

Fesc/Feid-Fesc/Agsp ht	[88 ha/217 acres]
Abla/Xete-Abla/Vasc ht	[47 ha/118 acres]
Abla/Pial-Vasc ht	[10 ha/ 24 acres]
Pial ht	[11 ha/ 27 acres]

SAF Cover Types are:

218: Lodgepole pine	[47 ha/118 acres]
206: Spruce-fir	[10 ha/ 24 acres]
208: Whitebark pine	[11 ha/ 27 acres]

Shrub species:
Amelanchier alnifolia, Artemisia frigida, Berberis repens, Juniperus communis, Lonicera utahensis, Ribes lacustre, Vaccinium globulare, and V. scoparium.

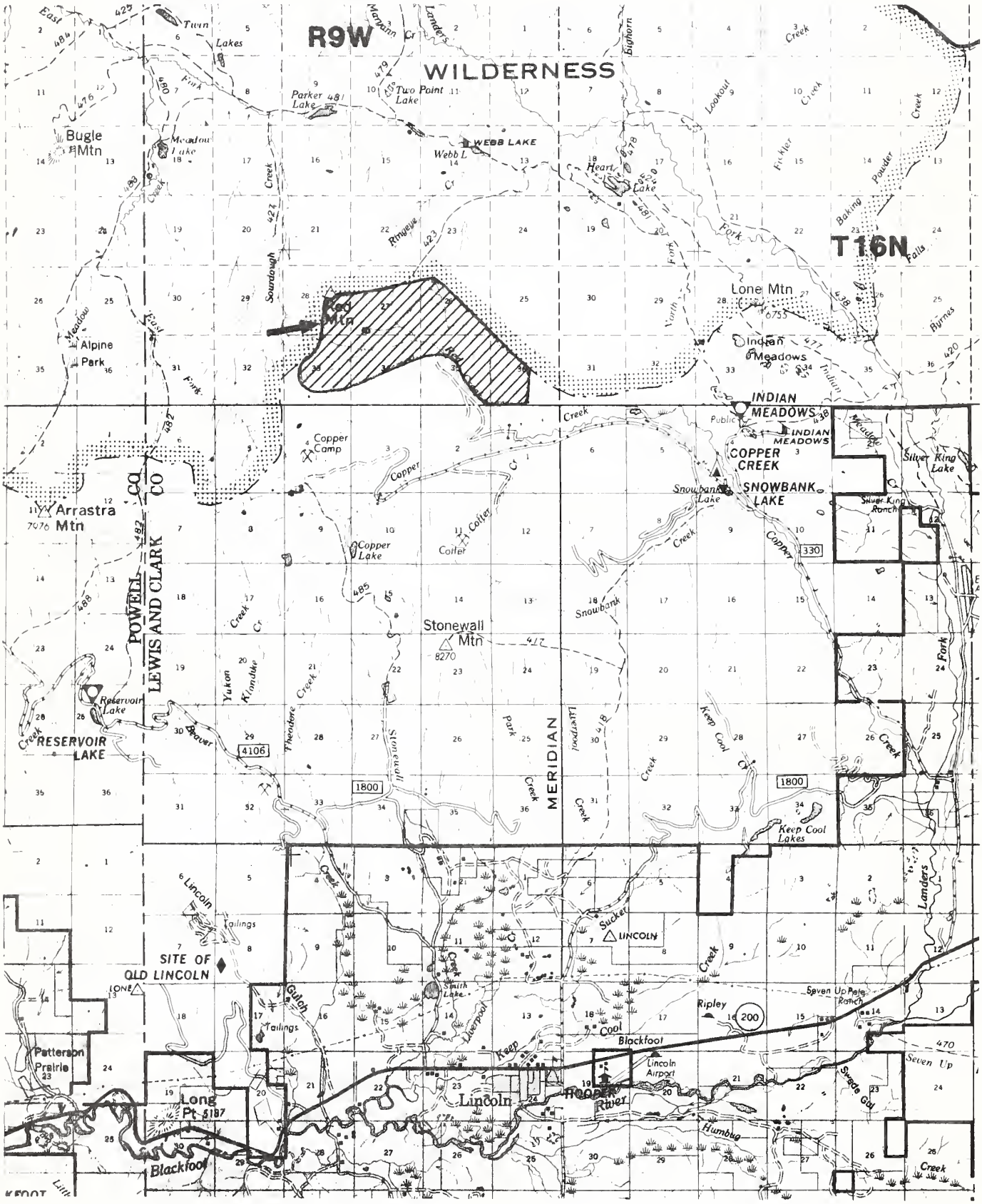
Dominant graminoides:
Pseudoroegneria spicata, Carex filifolia, C. geyeri, Calamagrostis rubescens, Danthonia intermedia, Festuca idahoensis, F. scabrella, Juncus spp., Koeleria cristata, Luzula hitchcocki, and Stipa occidentalis.

Forbs (grassland & forest):
Achillea millefolium, Anemone patens, Antennaria rosea, Arenaria congesta, Arnica cordifolia, A. latifolia, Erigeron speciosus, Erythronium grandiflorum, Eriogonum umbellatum, Gaillardia aristata, Geum triflorum, Osmorhiza chilensis, Phlox hoodii, Senecio canus, Thalictrum occidentale, Valeriana sitchensis, and Xerophyllum tenax.

No specific listings exist for the vertebrate and invertebrate species that occupy high mountain grasslands and associated subalpine forests. It is suspected that elk (Cervus canadensis) and mule deer (Odocoileus hemionus) make regular use of the GB-RNA. Smaller mammals and birds associated with prairie-forest edges likely provide a moderate level of diversity.

Historically the GB-RNA was subjected to domestic grazing, by sheep and horses; signs of past campsites remain, but no written record was found of the levels of this early grazing use. The fescue communities appear to be in excellent condition at this time.

RED MOUNTAIN PROPOSED RNA



52. RED MOUNTAIN PROPOSED RESEARCH NATURAL AREA

This RMA is situated at 2869 m (9411') in NW MT, supporting extensive wind-swept alpine tundra ecosystems. An outlier population of alpine larch occurs with whitebark pine, lodgepole pine and limber pine, much of which is in the form of krummholz timber. This area has red argillite and light-colored limestone substrates. Fellfields are common in tundra parts of this RNA.

****

The Red Mtn. Research Natural Area (RM-RNA) features a representative assortment of alpine tundra vegetation, as well as an eastern outlier of alpine larch. RM-RNA covers 757 ha (1870 acres) of tundra-timberline 15 km west of the Continental Divide; it is adjacent to the Scapegoat Wilderness. Other trees include limber pine which is uncommon west of the Divide in MT; whitebark pine and lodgepole pine combine with limber pine occupying parts of the gently, rounded slopes of Red Mtn. This particular combination of pines is not common in this part of the northern Rockies.

Red Mtn. exhibits the impacts of past glaciation, plus scree and talus slopes. Upper montane and subalpine are founded on the lowest parts of the RM-RNA, and the wind-swept upper terrain has extensive timberline, krummholz, and barren fellfield vegetation. Stone stripes are present on the tundra. Wind causes parts of the ridge system to be snow-free throughout the winter; elsewhere deep snow drifts are formed. Grizzly bear (Ursus arctos) and possibly wolf (Canis lupus) are present in the RM-RNA.

The RM-RNA is located on the Lincoln District, Helena National Forest, Lewis and Clark Co., MT: 47° 47' N. lat., 112° 43' W. long. The area is mapped on the Stonewall Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

RM-RNA is located due north of Lincoln, MT, and is reached via the Copper Ck Rd # 330. This road connects with a 4 X 4 road which leads to the southeastern boundary of RM-RNA. Further hiking along Red Ck allows access to the main ridge system, including the summit of Red Mtn. A pack trail, # 423, enters the area from the north.

PHYSICAL AND CLIMATIC CONDITIONS

Red Mtn. has been severely scoured by alpine glaciers, forming cirque headwalls and basins, U-shaped valleys, etc. The tundra climate has generated stone stripes, fellfields, and other patterned ground.

Rocks include reddish-colored Precambrian argillites, and gray-colored dolomites and limestones. Average annual temperatures at 2800 m (9400') on Red Mountain are not known, but being above timberline would likely be very low; the midsummer months (July/Aug) would average below 10° C (50° F). Snow course data just below Red Mountain at 2119 m (6950') indicate depths up to 225 cm (88").

ECOLOGIC VALUES

The following forest habitat types are found on the RM-RNA:

Abla-Pial	ht	[155 ha/382 acres]
Pial-Abla	ht	[100 ha/246 acres]
Abla/Xete	ht	[110 ha/273 acres]
Abla/Caca	ht	[93 ha/230 acres]
Psme/Caru	ht	[13 ha/ 32 acres]
Alpine		[89 ha/221 acres]
Rockland		[108 ha/266 acres]
Fellfield		[28 ha/ 60 acres]
Talus		[40 ha/ 99 acres]
Lake		[1 ha/ 3 acres]

Forests occupy 65% of the RM-RNA: SAF Cover Types:

210: Douglas-fir [40 ha/100 acres]
218: Lodgepole pine [319 ha/788 acres]
Non-commercial [132 ha/325 acres]

Major shrub species in RM-RNA are: Juniperus communis, J. horizontalis, Acer glabrum, Vaccinium scoparium, Alnus incana, Potentilla fruticosa, Amelanchier alnifolia, Berberis repens, Spiraea betulifolia, and Shepherdia canadensis.

Representative groundlayer species: Carex geyeri, C. rossi, Calamagrostis rubescens, Luzula hitchcockii, Festuca scabrella, Agoseris glauca, Besseya wyomingensis, Xerophyllum tenax, Dryas octopetala, Erythronium grandiflorum, Eritrichium nanum, Poa alpina, and many other alpine species.

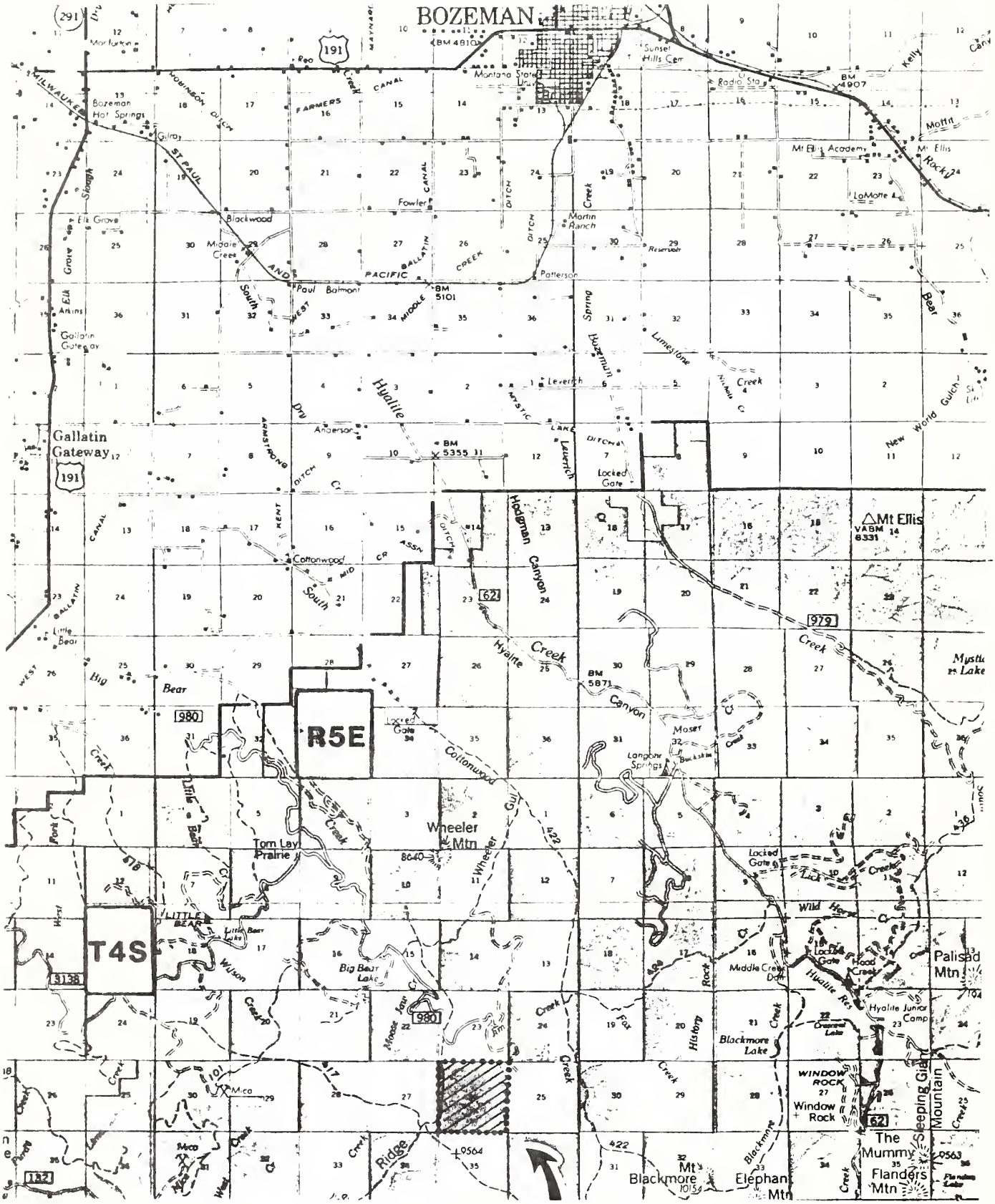
Representative mammals using the SM-RNA include:

- Grizzly bear - Ursus arctos
- Elk - Cervus canadensis
- W-t. deer - Odocoileus virginianus
- Black bear - Ursus americanus
- Bobcat - Lynx canadensis
- Mtn. goat - Oreamnos americanus
- Bighorn sheep - Ovis canadensis
- Pika - Ochotona princeps
- Marmot - Marmota flaviventris
- N. pocket gopher - Thomomys talpoides
- Snowshoe hare - Lepus americanus
- Coyote - Canis latrans
- Wolverine - Gulo gulo
- Wolf - Canis lupus (maybe)

Birds utilizing the SM-RNA:

- Common raven - Corvus corax
- Ruffed grouse - Bonasa umbellus
- C. nutcracker - Nucifraga columbiana
- Mtn. chickadee - Parus gambeli
- Pine grosbeak - Pinicola enucleator
- Pine siskin - Spinus pinus
- Magpie - Pica pica

WHEELER RIDGE PROPOSED RNA



53. WHEELER RIDGE PROPOSED RESEARCH NATURAL AREA

Located at the northern end of MT's Gallatin Range, this RNA features an extensive, old-growth (over 200 years old) stand of whitebark pine, with subalpine fir as a co-dominant; lodgepole pine is a major component on adjacent, lower elevational sites. Mountain streams and wet meadows are also present in this RNA.

****

The Wheeler Ridge Research Natural Area (WR-RNA) is situated on a broad, rounded and gentle northern slope of a mountain ridge system. It occupies an entire section, 259 ha (640 acres). Much of the RNA is between 2424 and 2667 m (8000 to 8800'); the lowest point is 2390 m (7840'). About 70% of the WR-RNA supports a uniform forest cover of mixed whitebark pine, subalpine fir and Engelmann spruce. The whitebark pine are straighter, larger and taller on this site than typically seen elsewhere in this part of the northern Rocky Mountains. Below 2424 m (8000') a 200 year-old lodgepole pine forest dominates another 20% of the WR-RNA landscape.

Several mountain streams, originating in steep-walled cirque basins, drain the area. Several small, wet sedge meadows occupy the streamside habitats. There are several large talus piles, slump topography and avalanche-chute sites in the vicinity of the cirque basins. WR-RNA serves as summer range for a number of bird and mammal species. Occasional old-growth Douglas-fir, with one meter (3') dbh's and heigths of 27 m (90') are present in the lower lodgepole pine stands; some of the Douglas-fir display fire scars and char on their trunks.

The WR-RNA is located on the Bozeman District, Gallatin National Forest, Gallatin Co., MT: 45° 25' N. lat., 111° 05' W. long. The area is mapped within the Garnet Mountain Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

The WR-RNA has good road access via the Bear Creek Rd # 980 originating just south of Gallatin Gateway. An old trail along Bear Ck and Telephone Ridge provides access directly into WR-RNA.

PHYSICAL AND CLIMATIC CONDITIONS

The basic physiographic features are described above. The WR-RNA's geology consists of tertiary volcanic rocks overlying Paleozoic sedimentary strata of middle Cambrian age. Rock include quartzite, shales and limestone; they are exposed only in the cirque basin in the southwest corner of the RNA. Volcanic breccias and lava flows cover much of the rock formations. The lava flows appear as talus slopes in the southern part of WR-RNA.

Climatic data are not available; the nearest station is at Squaw Ck Ranger Station, 13 km (8 miles) to the west at 1616 m (5300') and at Gallatin Gateway 16 km (10 miles) northwest (1028 m/3372'). Average annual temperature at the latter station is 3° C (37° F). Estimated annual precipitation is 138 cm (55") much of this in the form of snow.

ECOLOGIC VALUES

The following forest habitat types are found on the WR-RNA:

Pial-Abla	ht	[12 ha/ 30 acres]
Abla-Pial	ht	[186 ha/460 acres]
Abla/Vasc	ht	[8 ha/ 20 acres]
Abla/Vagl	ht	[4 ha/ 10 acres]
Abla/Caca	ht	[25 ha/ 60 acres]
Talus/Scree		[14 ha/ 35 acres]
Wet Meadows		[10 ha/ 25 acres]

The forests fit into the following SAF Types:

218: Lodgepole pine	[52 ha/128 acres]
206: Spruce-fir	[78 ha/192 acres]
208: Whitebark pine	[104 ha/256 acres]

Major shrub species in WR-RNA are:

Abies lasiocarpa (krummholz), Juniperus communis, Lonicera utahensis, Ribes lacustre, Spiraea betulifolia, Vaccinium globulare, and V. scoparium.

Representative groundlayer species: Carex geyeri, Danthonia intermedia, Deschampsia caespitosa, Calamagrostis canadensis, Festuca viridula, Juncus parryi, Aquilegia flavescens, Epilobium alpinum, Mertensiana oblongifolia, Xerophyllum tenax, Senecio triangularis, Erythronium grandiflorum, Sibbaldia procumbens, and Trollius laxus.

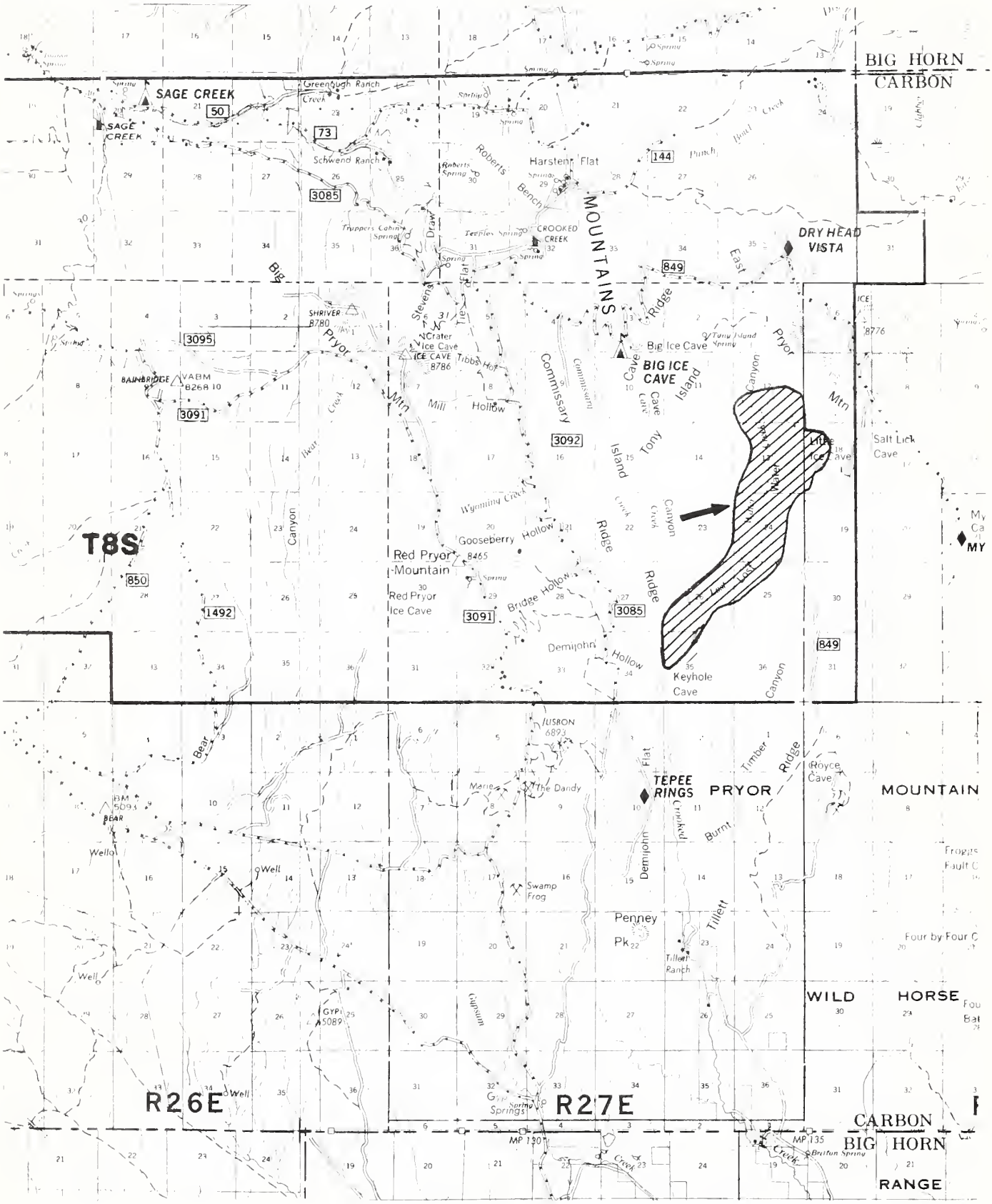
Representative mammals using the WR-RNA include:

Elk - Cervus canadensis
W.t. deer - Odocoileus virginianus
Black bear - Ursus americanus
Pika - Ochotona princeps
Y.b. marmot - Marmota flaviventris
Snowshoe hare - Lepus americanus
Coyote - Canis latrans

Birds utilizing the WR-RNA:

Common raven - Corvus corax
Ruffed grouse - Bonasa umbellus
C. nutcracker - Nucifraga columbiana
Mtn. chickadee - Parus gambeli
Pine grosbeak - Pinicola enucleator
Mtn bluebird - Sialia currucoides
Stellar's jay - Cyanocitta stelleri

LOST WATER CANYON PROPOSED RNA



54. LOST WATER CANYON PROPOSED

RESEARCH NATURAL

AREA

Rhis RNA consists of rugged limestone canyon located in the SE part of the Pryor Mtns. in south-central MT. Covering 660 ha (1630 acres), this RNA features interior Douglas-fir forests, stands of limber pine as well as cottonwood-willow communities. Some alpine meadow vegetation is also present, with subalpine fir interspersed.

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The Lost Water Canyon Research Natural Area (LWC-RNA) encompasses an entire canyon plus two branch canyons. A stream, Lost Water Ck, runs intermittently, except in a central section. Here green mossy springs and seeps are present, forming a clear mountain brook which suddenly vanishes. The creek bottom contains passageways of limestone bedrock. LWC-RNA canyon is bordered by vertical limestone cliffs. Eagles and falcons nest on these cliffs. LWC-RNA represents one of the eastern-most occurrences of Douglas-fir which forms a nearly unbroken stand of forest cover.

The vertical cliffs are composed of Madison limestone of Mississippian age. The plateaus surrounding the northern end of the canyon are windblown subalpine featuring low-growing forbs and grasses with some subalpine fir also present, some of which is stunted. On xeric south exposures, limber pine is locally dominant. Lodgepole pine is the major seral species in the Douglas-fir and subalpine fir sites. On the plateaus juniper and sagebrush (Artemisia tridentata) are dominant. Streamside hardwoods, such as aspen, mountain maple (Acer glabrum) and cottonwoods predominate where moisture is available.

The highest point is 2515 m (8300') at the north boundary; the lowest point is 1552 m (5120') where the canyon converges with Crooked Ck. LWC-RNA is located on the Beartooth District, Custer National Forest, Carbon Co., MT: 45° 08' N. lat., 108° 21' W. long. The area is mapped within the USGS East Pryor Mountain, Red Pryor Mountain and Mystery Cave Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

LWC-RNA is reached by travelling south from Laurel, MT on Hwy # 310; proceed east from Bridger, MT until intersection with Sage Ck Rd # 3085 is reached; follow this latter route one mile southeast of Dry Head Vista. From this point the upper reaches of LWC-RNA are accessible by hiking one mile bearing S-SE.

PHYSICAL AND CLIMATIC CONDITIONS

LWC-RNA is an isolated canyon system bordered on its sides by vertical Madison limestone cliffs of Mississippian age. The upper plateaus are severely windblown. The forest soils are deep and well drained, except where slopes are very steep; they are derived from limestone materials. Shallow soil sites are dominated by limber pine.

Annual moisture ranges from (15-50 cm) 6-20"; July temperatures average 22 °C (72° F), while Jan. temperatures are -8° C (17° F). The nearest climate station is at Bridger, MT.

ECOLOGIC VALUES

The following forest climax series and (SAF Cover Types) are found on the LWC-RNA:

Douglas-fir (210)	[557 ha/1375 acres]
Limber pine (219)	[79 ha/ 195 acres]
Subalpine fir (206)	[16 ha/ 40 acres]
Non-forested	[8 ha/ 20 acres]

Other trees present include: Juniperus scopulorum, Populus angustifolia, P. deltoides, P. tremuloides, and Picea engelmannii.

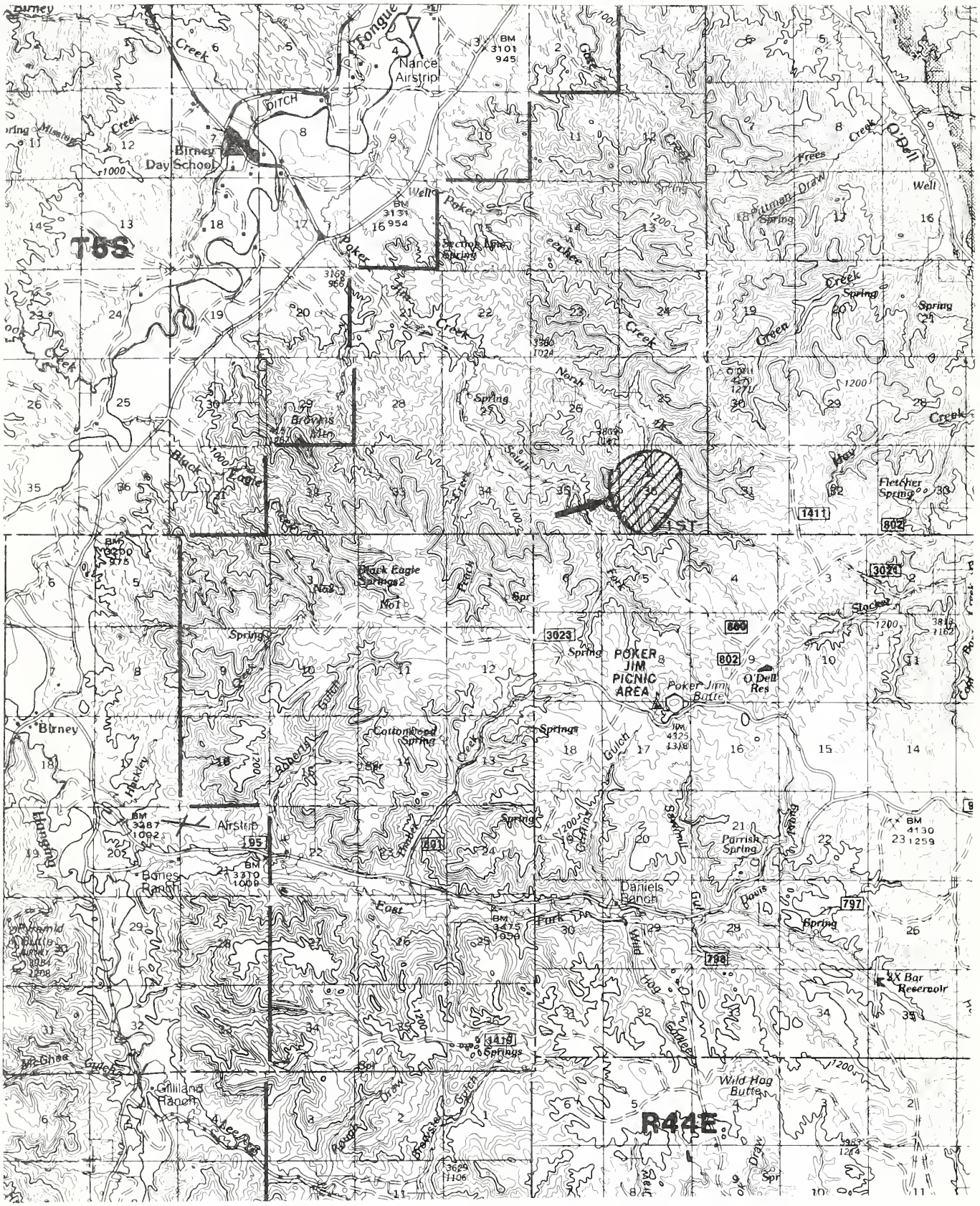
Major shrub species in LWC-RNA are: Berberis repens, Acer glabrum, Cornus stolonifera, Juniperus communis, Physocarpus malvaceus, Prunus virginiana, Ribes lacustre, R. setosum, Rubus idaeus, Salix spp., Shepherdia canadensis, Spiraea betulifolia, Symphoricarpos oreophilus, and Vaccinium scoparium.

Representative groundlayer species: Achillea millefolium, Agoseris glauca, Pseudoroegneria spicata, Festuca idahoensis, Elymus canadensis, Carex geyeri, C. filifolia, Campanula rotundifolia, Heracleum sphondylium, Fragaria vesca, Mertensia oblongifolia, Erigeron peregrinus, Balsamorhiza sagittata, Mitella pentandra, Koeleria cristata, Stipa comata, and Galium boreale.

Mammals using the LWC-RNA include:
Elk - Cervus canadensis
Mule deer - Odocoileus hemionus
Black bear - Ursus americanus
Bobcat - Lynx rufus
Red squirrel - Tamiasciurus hudsonicus
N. pocket gopher - Thomomys talpoides
Redback vole - Clethrionomys gapperi

Birds utilizing this RNA include:
Common raven - Corvus corax
Golden eagle - Aquila chrysaetos
Prairie falcon - Falco mexicanus
H. woodpecker - Dendrocopus villosus
Mtn. chickadee - Parus gambeli
W-b. nuthatch - Sitta carolinensis

POKER JIM RNA



55. POKER JIM

RESEARCH NATURAL AREA

Located in southeastern Montana, the area represents a good example of an undisturbed mixture of ponderosa pine, sagebrush-grass, and grassland types only slightly altered by man-initiated activities. The pine is present in several age classes interspersed with the prairie and shrub communities. RNA is entirely on federal National Forest lands.

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The Poker Jim Research Natural Area (PJ-RNA) occupies a major fork of Poker Jim Ck, within the Tongue River member of the Fort Union Formation. It covers 147 ha (363 acres). The area has not been glaciated and water has been the principal erosional agent of the landscape. Although it was within a grazing allotment it was classified as secondary range due to the lack of stock water; it is now fenced with cattle excluded. Elevations range from 1076-1235 m (3550-4075').

Although the ponderosa pine is of commercial quality, it has been subjected to only minor removals in the past; none in recent times. Other tree species in PJ-RNA include: Mtn. alder, Rocky Mtn juniper, narrowleaf cottonwood, plains cottonwood, water birch, and green ash.

The PJ-RNA establishment record documents the presence of over 200 vascular species, but does not provide any measure of their relative abundances. Included among these are one or more species within the following graminoid genera: Pseudoroegneria, Andropogon, Bouteloua, Bromus, Buchloe, Calamagrostis, Carex, Festuca, Koeleria, Muhlenbergia, Poa, Sitanion, Stipa, and Danthonia.

Poker Jim RNA is located on the Fort Howes District (Ashland Division) of the Custer National Forest, Rosebud Co., MT: 45° 25' N. lat., 106° 22' W. long. The area is mapped within the USGS Poker Jim Butte and Browns Mountain Quadrangles, 7.5' series.

ACCESS AND ACCOMMODATIONS

PJ-RNA is located specifically in S 36, T-5-S, R-43-E, NE from the Fort Howes Ranger Station. It may also be approached from the west from the vicinity of Tongue River-Birney; a 4-WD track follows Poker Creek to the south boundary of PJ-RNA. Cross-country travel on foot over rolling grassland terrain gives access to all parts of the RNA.

PHYSICAL AND CLIMATIC CONDITIONS

Geologically, the area is a part of the Fort Union Formation, consisting of nearly level beds of soft sandstones, shales, and lignite beds. Large areas of lignite beds have burned resulting in scoria and clinker beds. The character of the area's soils is closely related to these geologic materials. Past fires, which effected the vegetation, have been nearly eliminated.

A continental climate prevails with cold winters and very warm summers. The climate is semiarid with high precipitation intensities (severe storms): about 75% of the annual precipitation comes during the growing season (Apr.-Sept.); average annual moisture ranges from 30-40 cm (12-17").

ECOLOGIC VALUES

The timber and grassland communities have not been sampled or described quantitatively, although a relatively complete floristic listing is provided in the PJ-RNA establishment record. The epiphytic lichens in the pine-grassland communities in the Ashland Division of the Custer National Forest have been systematically studied by S. Eversman (1982, Epiphytic lichens of a ponderosa pine forest in southwestern Montana, The Bryologist 85(2): 204-213.

Four forest habitat types are present:

1. Xeric Sites: Pipo/Agsp habitat types, with understories dominated by Rhus trilobata, Yucca glauca, and Juniperus horizontalis.

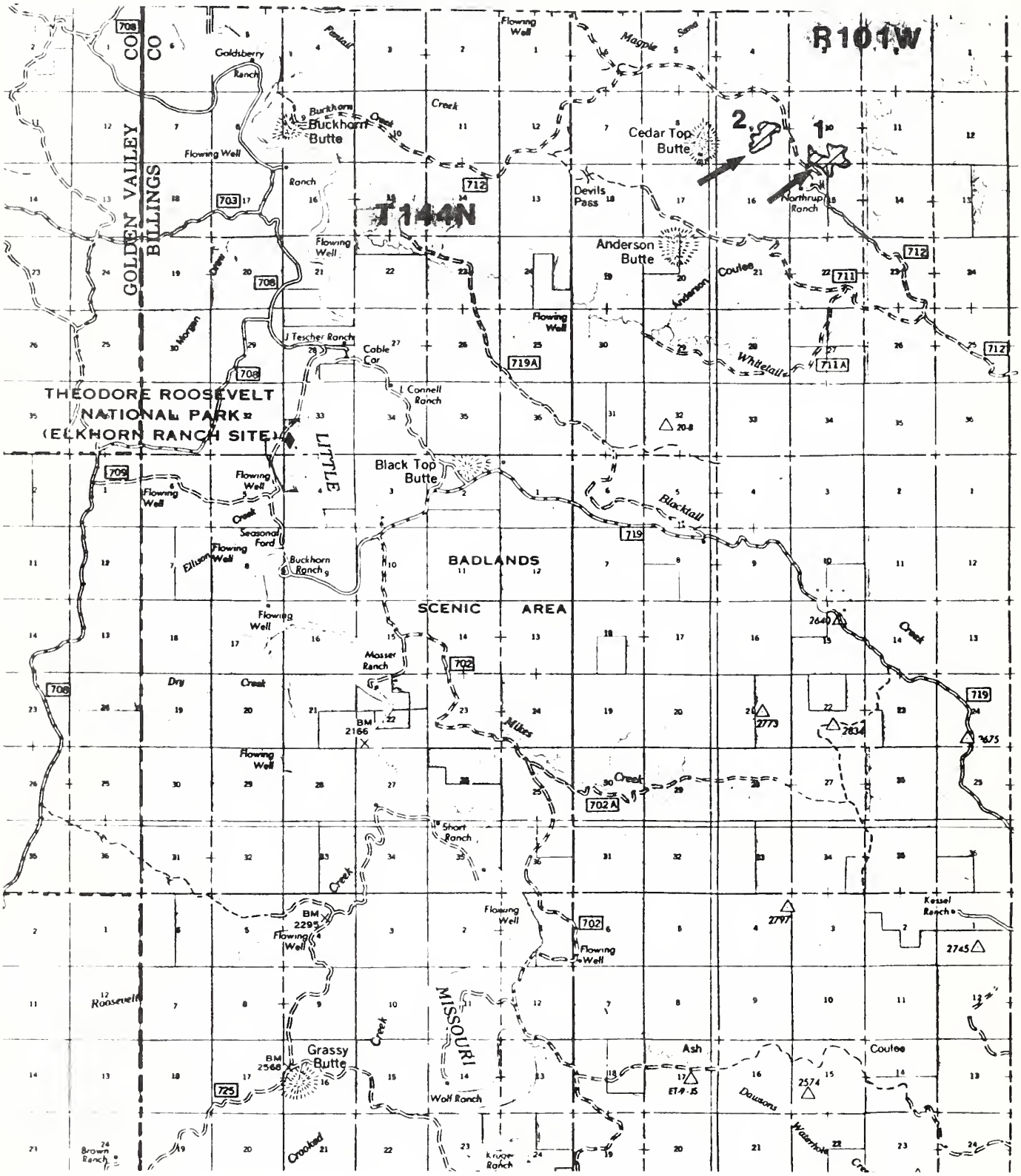
2. Meso-xeric Sites: Pipo/Feid or Pipo/Syal habitat types, the latter with small Amelanchier alnifolia and Berberis repens.

3. Mesic Sites: Pipo/Prvi habitat type on lower north slopes where A. alnifolia and Crataegus douglasii are also found.

4. Riparian Sites: Populus deltoides stands with C. douglasii and Prunus virginiana along intermittent and permanent streams.

Wildlife occupying PJ-RNA include:
Antelope - Antilocarpa americana
Mtn. cottontail -Sylvilagus nuttalli
Coyote - Canis latrans
Mule deer - Odocoileus hemionus
White-tailed deer - O. virginianus
Badger - Taxidea taxus
Swift fox - Vulpes velox
W-t. jackrabbit - Lepus townsendi
Prairie dog - Cynomys ludovicianus
Kangaroo rat - Dipodomys ordi
Yellowstone bat - Myotis carissima
Prairie falcon - Falco mexicanus
Golden eagle - Aquila chrysaetos
Peregrine - Falco peregrinus
Magpie - Pica pica
Pinon jay - Gymnorhinus cyanocephalus
Turkey vulture - Cathartes aura
Sharptail grouse - Pediocetes

TWO TOP (1) AND BIG (2) MESAS RNA



56. TWO TOP AND BIG TOP MESAS

RESEARCH NATURAL AREA

Located in ND, the two mesas are covered by a mixture of native prairie, dominated by western wheatgrass, blue gramma, thickspike wheatgrass, Junegrass, and needle and thread. No domestic grazing has occurred. Some past fire (1940's) and a single instance (1930's) of hay mowing have affected the vegetation.

****

The Two Top and Big Top Mesas Research Natural Area (TTBT-RNA) are composed of two adjacent hills with flat tops, extending 120 m (400') above the surrounding area. The steep side slopes have given protection to the natural values. The areas are unaltered by any human influence controllable by man. The total area of Big Top Mesa is 5.5 ha (15 acres); Two Top North Mesa is 0.7 ha (2 acres) and Two Top South is 0.45 ha (1.2 acres). The total area of each mesa is 16 ha (40 acres).

Both mesas are located within the Little Missouri "Badlands". Their escarpments are composed of clay and sandstone. They are remnants of a higher landscape that has been eroded away. The dominance of wheatgrasses places the vegetation within the midgrass priaire classification, rather than mixed grass prairie". Dominants are: western wheatgrass (Pascopyrum smithii), thickspike wheatgrass (Elymus lanceolatus), blue gramma (Bouteloua gracilis), Junegrass (Koeleria cristata) and needle and thread (Stipa comata). Based on detailed studies (reported in Ecology 39, 1958), the compositions vary between Two Top and Big Top Mesas.

TTBT-RNA is located on federal land within the Medora District of the Little Missouri National Grasslands, a portion of the Custer National Forest; Billings Co., ND: 47° 18' N. lat., 103° 28' W. long. The area is mapped within the USGS Square Top Butte Quadrangle, 7.5' series.

ACCESS AND ACCOMMODATIONS

TTBT-RNA may be reached from I-94, by going north on ND Hwy # 85 from the Belfield Exit, 22 miles to the Magpie Rd leading west 16 miles to the turn at the Willis Northrup property (center of section 15), and continue on a low standard road (impassable when wet) to the saddle divide between Two Top and Big Top. Climb Big Top on NE corner; Two Top at its SW end.

PHYSICAL AND CLIMATIC CONDITIONS

TTBT-RNA occupies two mesas each surrounded by steep to vertical escarpments of clay and sandstone within the Little Missouri "Badlands". They are remnants of a higher land level. Much of the surrounding country has been eroded away leaving these mesas topped with Chestnut deep silt loam soil.

Average annual precipitation is about 37 cm (15"), with 80% of this coming between Apr. and Sept. Much of the moisture comes as localized storms of great intensity (rain and hail). The frost-free period extends between May 20th and Sept. 15th.

ECOLOGIC VALUES

A good description of the vegetation was published by C. L. Quinnilder and H. E. Cosby, 1958. Relicts of Climax Vegetation on Two Mesas in Western North Dakota, Ecology 39(1):29-32. A second study was completed by B. Heidel, North Dakota Natural Heritage Program, Bismarck, ND. The following is from Heidel's samplings:

Area	Species	Relative Basal Area Cover
Big Top:		
	Pascopyron smithii	51%
	Bouteloua gracilis	13
	Carex elocharis	11
	Carex filifolia	7
	Bromus japonicus	6
	Other Species	12
Two Top North		
	Elymus lanceolatus	22%
	Koeleria pyramidata	20
	Bouteloua gracilis	17
	Stipa comata	14
	Other Species	27
Two Top South:		
	Elymus lanceolatus	34%
	Pascopyron smithii	34
	Carex filifolia	13
	Other Species	19

Big Top has a low density of Artemisa cana and some A. tridentata, while Two Top has a high density of A. tridentata. The mesas also have a few Symphoricarpos occidentalis and Rhus trilobata. Big Top Mesa was burned in 1939 or 1940, based on fire scars on Juniperus scopulorum below the mesa.

Informal observations suggest the presence of:

E. cottontail -Sylvilagus floridanus
Coyote - Canis latrans
Mule deer - Odocoileus hemionus
Badger - Taxidea taxus taxus
Red fox - Vulpes fulva
Mice - Peromyscus spp.
Prairie falcon - Falco mexicanus
Meadowlark - Sturnella neglecta
S-t. grouse - Pediocetes phasianellus
S. grouse - Centrocercus urophasianus

57. ABSAROKA-BEARTOOTH WILDERNESS

The Absaroka-Beartooth Wilderness (ABW) includes two contrasting mountain ranges. The western and central part consists of the steep, rugged Absaroka Mountains, composed of volcanic and metamorphic rocks. The Absarokas are mostly forested, with only the highest peaks and ridges rising above timberline. To the east lie the Beartooth Mountains, a massive block of very old plutonic and metamorphic rock sculptured by glaciers. The Beartooth is made up of broken plateaus and mountain peaks largely above tree line and occupied by tundra, alpine rockland, lakes and small glaciers.

The ABW covers nearly 405,000 ha (one million acres) and lies directly north of Yellowstone National Park, within portions of three National Forests: the Gallatin (with headquarters at Bozeman, MT); the Custer (Billings, MT); and the Shoshone (Cody, WY). Ranger districts are outlined on the accompanying map, and their offices are located in Red Lodge (phone 406-446-2103), Big Timber (536-5155), Livingston (222-1892), and Gardiner (848-7375), MT, and in Powell (307-754-2407), WY. The district on which a research project is to be conducted should be contacted in advance in order to obtain the necessary special-use permit.

The ABW, especially the high-elevation Beartooth, offers a unique opportunity for research. There are extensive areas of alpine tundra that are subjected to heavy recreational use during the summer. The Forest Service has been conducting some research on appropriate methods for restoring damaged campsites, disposing of human wastes , and revegetating campfire sites. There is a need for additional research on these and related topics.

ACCESS AND ACCOMMODATIONS

The ABW boundary is approached in many locations by unimproved or graded forest roads, and from the Beartooth Highway (U.S. 212) between Red Lodge and Cooke City. Access within the wilderness is provided by a network of trails leading from these roads. Primitive campsites (without shelters or other facilities) are located at frequent intervals along the trails. There is no commercial lodging, but several outfitters and guides are available to cater trips or to transport supplies. A topographic map of the wilderness is available from national forest offices for $1.

PHYSICAL AND CLIMATIC CONDITIONS

The Absaroka Range is a chain of rugged mountains having a complex pattern of rock types, including numerous mineral deposits. In some areas on the western edge of the ABW, volcanic rocks contain petrified wood. To the west of the ABW on the Gallatin National Forest, major deposits of petrified trees are found in the Gallatin Petrified Forest, where permits can be obtained for minor collecting. Many of the log deposits have pines and spruces mixed with temperate and subtropical hardwoods. These trees were swept up in volcanic mudflows about 50 million years ago.

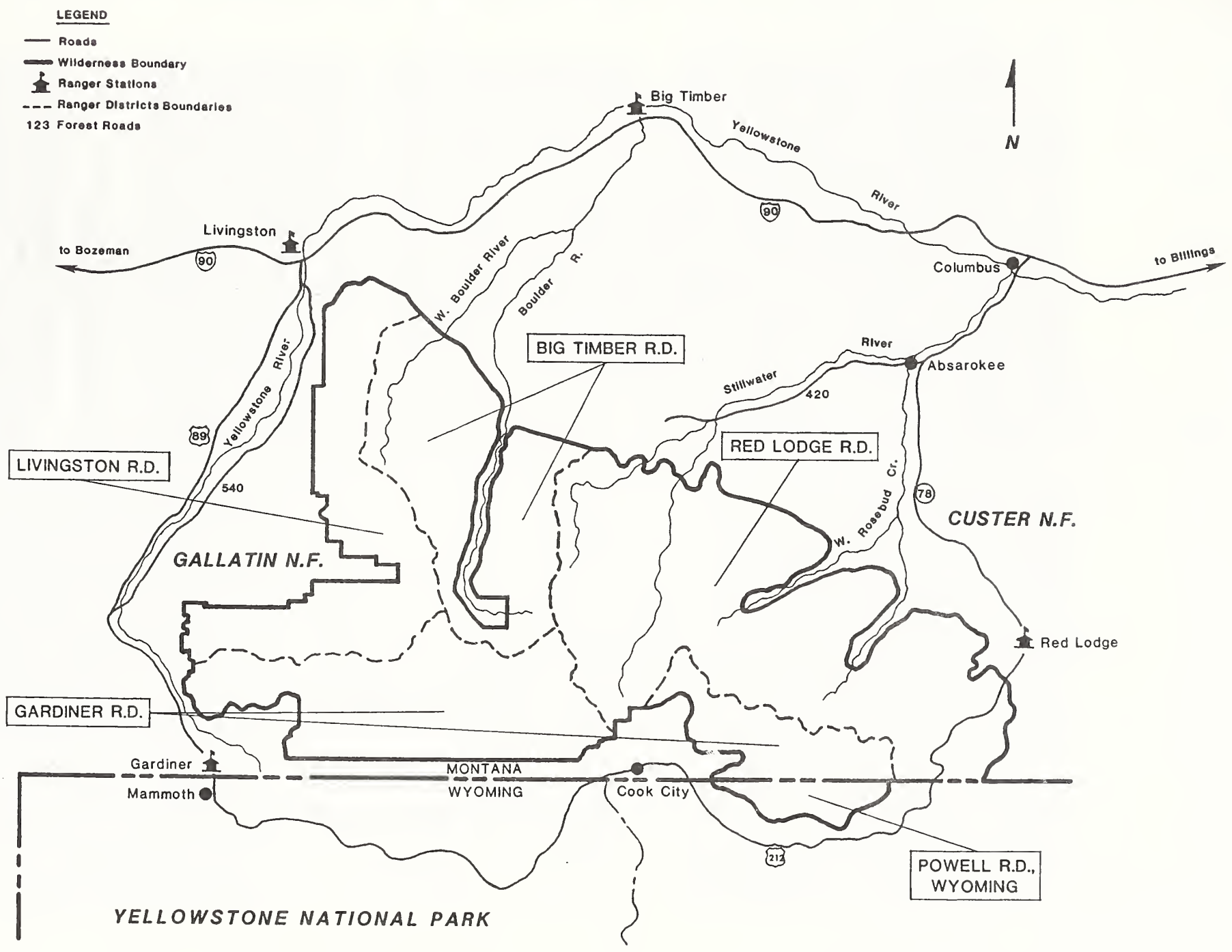
Landforms in the Absaroka Range are characterized by steep rocky ridges and peaks mixed with gentler mountain terrain. The highest peaks attain elevations between 2900 and 3400 m (9500 and 11,200'), while the canyon bottoms lie at 1500 to 2000 m (5000 to 6500'). Major streams meander down U-shaped glacial valleys.

The Beartooth Mountains consist of a massive block of Precambrian basement rock (mostly gneiss and schist) which was metamorphosed about 3.2 billion years ago, making it one of the oldest known rock formations in the world. It has been intruded by granite, and covered by sedimentary rocks, which have been eroded from most of the range. Some of the sedimentary rocks remain in small patches in the Beartooths, where they form high peaks such as Beartooth Butte. However, most of the sedimentary mantle slid off when the Beartooth was uplifted. Because of its exceptionally high elevation, the Beartooth was heavily glaciated and contains spectacular examples of steep-walled gorges, knife-edge ridges, and other glacial features.

Tree line occurs at about 2900 m (9500') in elevation, and about 60 percent of the Beartooth lies above this level, with numerous peaks exceeding 3660 m (12,000'). Several small glaciers exist above the 3050 m (10,000') level. Some of these contain large quantities of grasshoppers that were entombed decades or centuries ago when their migration flights encountered severe summer storms. Summer snow and sleet storms are common on the Beartooth.

The alpine tablelands of the Beartooth are underlain by permafrost which thaws only at the surface during summer. The permanently frozen subsoil

ABSAROKA-BEARTOOTH WILDERNESS



is watertight; thus in summer much of the surface is soggy. Stone nets, solifluction lobes, and other features of patterned ground develop here as they do in the Arctic.

The ABW has a continental mountain climate largely controlled by altitude. Average annual precipitation ranges from about 50 cm (20") in the lower mountain canyons to 127 cm (50") or more in the alpine zone. June is usually the wettest month of the year. At lower elevations average daily temperatures remain below freezing only from November through March, while in the alpine zone subfreezing average temperatures prevail from late September until mid-May. In the alpine, even July has average daily temperatures of only 5 to 9 deg. C. (41 to 49 deg. F.) and severe frosts and snowstorms can occur, often with little warning.

ECOLOGIC VALUES

The following forest habitat type series (potential climax) are found:

Pinus flexilis h.t.s (restricted to dry limestone sites)

Pseudotsuga menziesii h.t.s

Pinus contorta community types

Picea engelmannii h.t.s

Abies lasiocarpa h.t.s

SAF Forest Cover Types include:

219: Limber pine

210: Interior Douglas-fir

218: Lodgepole pine

206: Engelmann spruce-subalpine fir

208: Whitebark pine

Other distinctive vegetation types include extensive alpine tundra, fellfield, rockland, periglacial, and permafrost-related communities. There are also bunchgrass communities on dry sites at lower and middle elevations within the ABW. These are generally dominated by *Agropyron*, *Festuca*, and *Hesperochloa*. In the Absaroka Range, sizeable mountain meadow communities are dominated by broadleaved herbs or by sedges (*Carex*) on moist sites. The northwestern portion of the Absaroka Range also contains disjunct populations of some forest understory species–*Xerophyllum tenax* (beargrass) and *Menziesia ferruginea*–whose main distributions lie west of the Continental Divide in Montana and northern Idaho.

According to botanist Klaus Lackschewitz of Missoula, MT, the following plants which are rare in Montana can be found in the ABW: *Salix barrattiana*, *Koenigia islandica*, *Papaver kluanense*, *Draba fladnizensis*, *Draba porsildii*, *Cymopterus hendersonii*, *Gentiana tenella*, *Pedicularis oederi* , *Erigeron flabellifolius*, *Senecio amplectens*, *Senecio fuscatus*; *Juncus biglumis*, *J. castaneus*, and *J. triglumis*; *Carex misandra*; and *Phippsia algida*.

Aquatic and riparian habitats are numerous and include oligotrophic, snow-fed streams and alpine lakes, as well as shallow ponds, wet meadows, and a few bogs. In the Absaroka Range, several streams support native cutthroat trout. Some of the larger lakes also contain cutthroat. At various times Arctic grayling, and golden, cutthroat, rainbow, and Eastern brook trout have been introduced into many of the lakes. Some of these populations have become established, however , many lakes are barren.

Wildlife is abundant in the Absaroka Range , which supports major populations of moose, elk, mule deer, black bear, and grizzly bear. Bighorn sheep and a few mountain goats are also found. There are numerous predators and smaller animals typical of the Rocky Mountains. A significant population of mountain lions exists in the Absaroka Range. There are also pine martens, fishers, wolverines, weasels, otters, beaver, snowshoe hares, and red squirrels. Coyotes are common. Wild turkeys are found in the northern part of the Absaroka Range, and an array of birds typical of the Rocky Mountains is present.

The harsh environment of the Beartooth Mountains supports relatively little wildlife. In summer, there is some elevational migration of mule deer and moose. Resident mammals include hoary marmots, pikas, voles, and mice. There are small groups of mountain goats and bighorn sheep. Most of the birds found in the Beartooths, including golden eagles and prairie falcons, are summer residents or migrants. White-tailed ptarmigan and common ravens are among the few year-round residents of the high-country.

The following are a few references that describe various aspects of the ABW:

Alt, David D.; Hyndman, Donald W. 1986. Roadside geology of Montana. Missoula, MT: Mountain Press; 427 p.

Anderson, Bob. 1984. Beartooth country: Montana's Absaroka and Beartooth Mountains. He-

lena, MT: publ. by Montana Magazine, Inc.; 110 p.

Gurney, A. B. 1953. Grasshopper Glacier of Montana and its relation to long-distance flights of grasshoppers. Smithsonian Inst. Publ. 4121. Smithsonian Rep. 1952:305-325.

Johnson, P. L.; Billings, W. D. 1962. The alpine vegetation of the Beartooth Plateau in relation to cryopedogenic processes and patterns. Ecological Monographs 32:105-135.

Leiberg, J. B. 1904. Forest conditions in the Absaroka division of the Yellowstone Forest Reserve, Montana and the Livingston and Big Timber quadrangles. U.S. Geological Survey, Professional Paper 29:1-148.

Pattie, Donald L.; Verbeek, Nicolaas A. M. 1966. Alpine birds of the Beartooth Mountains. The Condor 68:167-176.

58. BOB MARSHALL, GREAT BEAR, AND SCAPEGOAT WILDERNESSES

The Bob Marshall, Great Bear, and Scapegoat wilderness complex (BMWC) forms a contiguous area of more than 600,000 ha (1.5 million acres) of wild, mountainous landscape straddling the Continental Divide in northwestern Montana. The BMWC encompasses an elevational gradient from 1200 m (4000') on the valley floor to 2830 m (9300') on the highest peaks. This geologically complex terrain supports a wide variety of vegetative associations. It is one of the largest intact ecosystems remaining in the 48 coterminous states. It includes a sizeable population of grizzly bears and nearly all of the other original wildlife species. Fire was a major initiator of vegetative succession in this ecosystem, and recently adopted policies allow lightning fires to burn as "prescribed natural fires."

The BMWC is administered by four national forests: the Flathead (with headquarters at Kalispell, MT); the Lolo (Missoula); the Lewis and Clark (Great Falls); and the Helena (Helena). The ranger district on which a research project is to be conducted should be contacted in advance in order to obtain the necessary special-use permit. Ranger districts are outlined on the accompanying map and their offices are located at Hungry Horse (Hungry Horse and Spotted Bear districts–phone 406-387-5243), Seeley Lake (677-2233), Choteau (466-5341), and Lincoln (362-4265).

The BMWC includes the headwaters of the South Fork and Middle Fork of the Flathead River, as well as the Sun River and parts of some other drainages. Mountain ranges within the wilderness complex include the Swan Range, the Flathead Range, 84 miles of the Continental Divide, and the Sawtooth or Front ranges.

The BMWC supports a relatively large population of grizzly bears that is probably less influenced by man than are the other populations south of Canada. Although researchers have studied the more heavily human-influenced grizzly populations in Yellowstone and Glacier National Parks, much less is known about how grizzlies live in the more secluded BMWC. Wolves provide another unique opportunity for possible research in the BMWC. Small numbers of wolves have been spreading southward and may well become established in the BMWC in the near future. If this happens, it would be highly interesting to document their effect on the sizeable elk and deer populations.

ACCESS AND ACCOMODATIONS

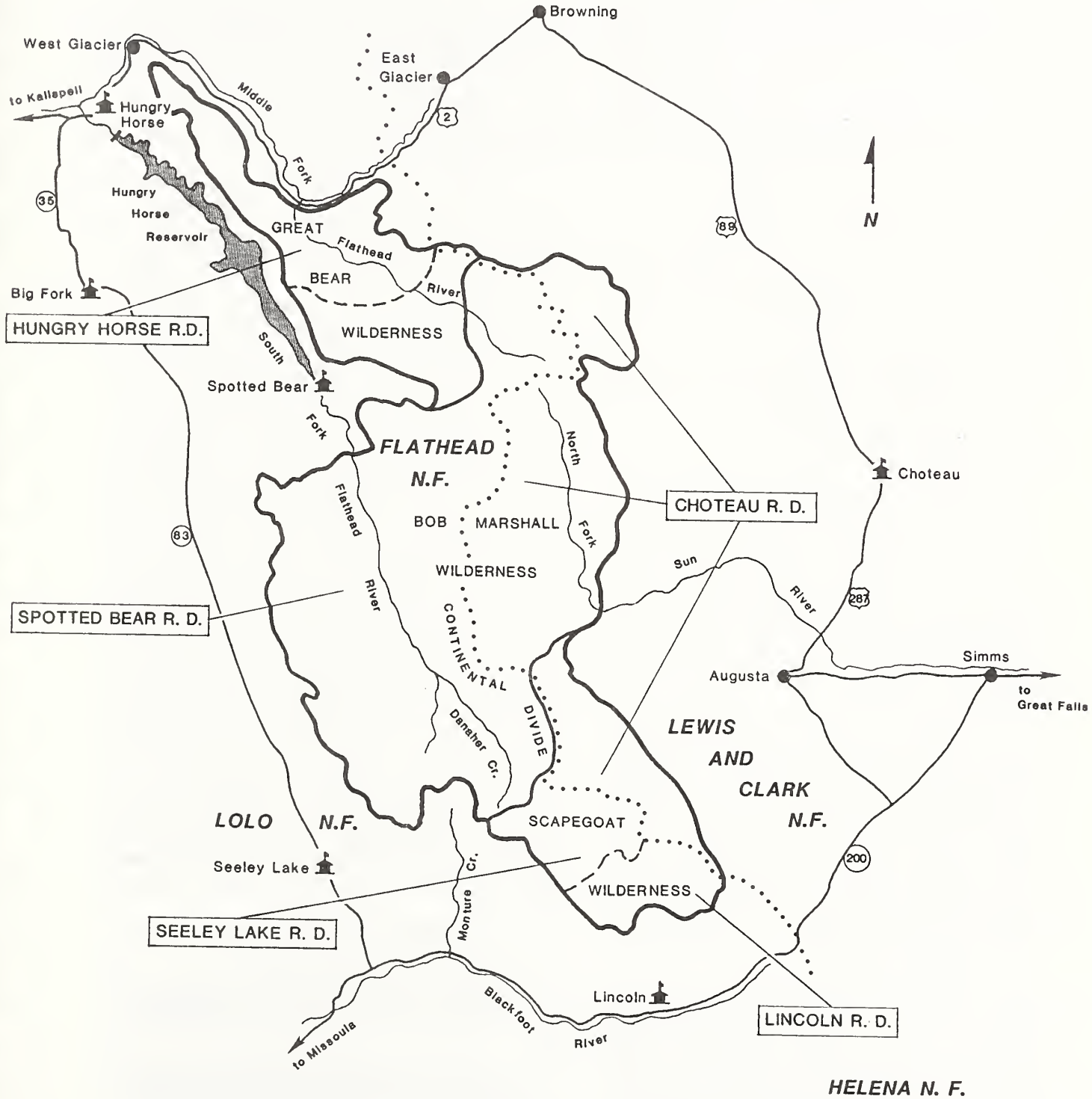
The BMWC is approached within a few miles by numerous forest roads that branch off from five federal or state highways: U.S. 2 to the north, Montana 83 to the west, Montana 200 to the south, and Montana 89 and 287 to the east. Access to the BMWC itself is provided via an extensive network of hiking and horse trails linked to the forest roads. The most popular wilderness portals are at Meadow Creek on the South Fork of the Flathead River, Holland Lake in the Swan Valley, the North Fork of the Blackfoot River near Ovando, and at Benchmark west of Choteau.

PHYSICAL AND CLIMATIC CONDITIONS

The BMWC consists of several north-south trending mountain ranges and intervening valleys. The surface rock largely alternates between limestone, sandstone, and argillite. The eastern area is the northwestern Montana disturbed belt and contains overthrust-faulted Paleozoic and Mesozoic sedimentary rocks that partly overlie at least two older structures. The overthrust faulting on many surfaces created a bizarre arrangement of sedimentary layers. Prominent ranges in the eastern part of the BMWC, called reefs, are made up largely of slabs of resistent Madison Limestone. Fossils are abundant in many of these strata. The succession of overthrust slabs extends westward through the BMWC with the rocks becoming generally older to the west. The western portion of the BMWC contains mostly Precambrian metasedimentary rocks. A few sills of Precambrian age are present locally and they are the only igneous rocks exposed in the area.

The BMWC experiences a continental mountain climate modified by frequent intrusions of moist air masses originating over the northern part of the Pacific Ocean. Precipitation is rather evenly distributed throughout the year, except that there is often a pronounced dry period in July and August. The northwestern part of the area is wettest, with some valley locations receiving 100 cm (40") of precipitation annually and some of the higher elevations receiving 150 cm (60") or more. Most of the BMWC

BOB MARSHALL WILDERNESS COMPLEX



HELENA N. F.

is drier, however, with lower elevations receiving 38 to 76 cm (15 to 30") and the high mountains 90 to 125 cm (35 to 50") annually. The area east of the Continental Divide is drier, windier, and generally experiences greater extremes of temperature. Winters are long, snowy, and with occasional invasions of continental polar air masses that send minimum temperatures into the -29 to -45 deg. (-20 to -50 deg. F.) range. Summers are warm, and during some years lightning fires become numerous.

ECOLOGIC VALUES

The BMWC has a broad range of forest habitat types within the *Pseudotsuga menziesii* and *Abies lasiocarpa* series (potential climax).

SAF Forest Cover Types include:

237: Interior ponderosa pine (isolated stands in the S. Fork Flathead drainage)
210: Interior Douglas-fir
218: Lodgepole pine
212: Western larch
206: Engelmann spruce-subalpine fir
208: Whitebark pine (includes alpine larch)

Other distinctive vegetative types include small areas of montane grassland (*Festuca scabrella*, *F. idahoensis*, *Agropyron spicatum*). There is also alpine tundra and fellfield vegetation atop the highest peaks and in severe wind-funnel sites along the Continental Divide, sometimes on contrasting rock substrates.

According to botanist Klaus Lackschewitz of Missoula, MT, the following plants of the BMWC are endemic to this general area–*Erigeron lackschewitzii*, *Physaria saximontana* var. *dentata*, *Synthyris canbyi*, *Cardamine rupicola*; the following are endemic to the northern Rocky Mountains in Montana and Idaho–*Astragalus molybdenus*, *Ribes hendersonii*; and the following are rare plants–*Oxytropis podocarpa*, *Carex incurviformis*, *Lychnis apetala* var. *montana*, and *Saussurea densa*.

Aquatic and riparian habitats include the upper stems of major rivers flowing through broad mountain valleys. Riparian communities along these rivers include Populus trichocarpa bottomlands. There are dozens of alpine lakes, some representing contrasting aquatic environments largely because they are located in different rock types. The lake fishery in the BMWC was very limited before fish plants were made; it consisted mostly of native cutthroat and bull trout that could migrate up streams without obstructions and into some lakes. The planting was quite successful in some lakes, which have then continued to maintain populations of westslope cutthroat, Yellowstone cutthroat, and rainbow trout. Many lakes in the BMWC are barren. In addition to trout, the rivers and larger streams contain sizeable populations of native mountain whitefish and longnose sucker.

Wildlife is diverse in this large wilderness complex. Mammals include elk, white-tailed deer, mule deer, moose, bighorn sheep, mountain goat, river otter, mink, marten, fisher, wolverine, bobcat, lynx, coyote, grizzly bear, black bear, and mountain lion. Commonly seen small mammals include the red squirrel, chipmunks, pika, and hoary marmot. Reptiles include the rubber boa, western yellow bellied racer, western terrestrial garter snake, red sided garter, painted turtle, and northern alligator lizard.

Over 200 species of terrestrial and aquatic birds occupy the BMWC at least part of the year. The diversity of bird species reflects great changes in habitat from dense coniferous spruce-fir forests in the northwest to mountain grasslands in the east. The relatively few year-round residents of the moist forests include blue, spruce, and ruffed grouse, chickadees, woodpeckers, nuthatches, and the brown creeper. Also, the obscure boreal owl is suspected to be present. The mountain grasslands support golden eagles and prairie falcons. There is historical evidence of resident peregrine falcons, and these may be reestablished in the future. White-tailed ptarmigans are among several species that are associated with the alpine tundra on the high ridges and peaks. The South Fork Flathead valley is a fall migration corridor for bald eagles, which feed on mountain whitefish, and it is possible that this eagle activity will increase as a result of declining kokanee salmon food sources immediately to the north in Glacier National Park.

The following are a few references that describe various aspects of the BMWC:

Alden, W. C. 1953. Physiography and glacial geology of western Montana and adjacent areas. Professional Paper 231, U.S. Geological Survey. 200 p.

Alt, David D.; Hyndman, Donald W. 1986. Roadside geology of Montana. Missoula, MT: Mountain Press; 427 p.

Ayres, H. B. 1901. The Lewis and Clark

Forest Reserve. 21st Annual Report, U.S. Geological Survey, Part V:27-80.

Cole, David N. 1983. Campsite conditions in the Bob Marshall Wilderness, Montana. Research Paper INT-312. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 18 p.

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Lucas, Robert C. 1985. Visitor characteristics, attitudes, and use patterns in the Bob Marshall Wilderness complex, 1970-82. Research Paper INT-345. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 32 p.

Rockwell, David B. (compiler) 1982. Flathead River basin bibliography. Kalispell, MT: Flathead River Basin Environmental Impact Study, U.S. Environmental Protection Agency. 354 p.

59. SELWAY-BITTERROOT WILDERNESS

This large Wilderness includes much of the rugged, heavily-forested drainage of the Middle Fork Clearwater River of northern Idaho as well as the heavily-glaciated Bitterroot Range, whose crest forms the Idaho-Montana border. Its primary features include snowfed streams and alpine lakes, diverse forests containing inland-maritime species and post-fire successional stages, and a rich assemblage of wildlife residing in a vast natural setting.

The 526,300 ha (1.3 million acre) Selway-Bitterroot Wilderness (SBW) lies within portions of four national forests: the Nez Perce (with headquarters at Grangeville, ID); Clearwater (Orofino, ID); Bitterroot (Hamilton, MT); and Lolo (Missoula, MT). The ranger district on which a research project is to be conducted should be contacted in advance in order to obtain the necessary special-use permit. Ranger districts are outlined on the accompanying map, and their offices are located at Grangeville (Moose Creek district–phone 208-983-2712), Kooskia (926-4275), and Powell (942-3113) in Idaho and at West Fork (406-821-3269), Darby (821-3913), Stevensville (777-5461), and Missoula (329-3750) in Montana.

The environmentally diverse SBW offers a multitude of opportunities for research. This Wilderness is unusual in having had a successful reintroduction of natural fires; since 1972 many lightning fires have been allowed to burn as "prescribed natural fires." Thus, patterns and effects of fires on vegetation, soils, and water are viable topics for research. Wildlife is also of interest. For example, would the SBW now provide suitable habitat for the locally extinct grizzly bear, and have whitebark pine cone crops (a wildlife food) been greatly reduced by blister rust and other factors? Other concerns relate to the effects of recreational use on the SBW and how resource damage can be minimized.

A large portion of today's SBW was originally given protection as a "Primitive Area" in 1932. The remote, rugged, uninhabitated character of this area was described by U.S. Geological Survey mappers and examiners, who surveyed the area in 1897 and 1898 and presented detailed findings in the 19th and 20th Annual Reports of the USGS.

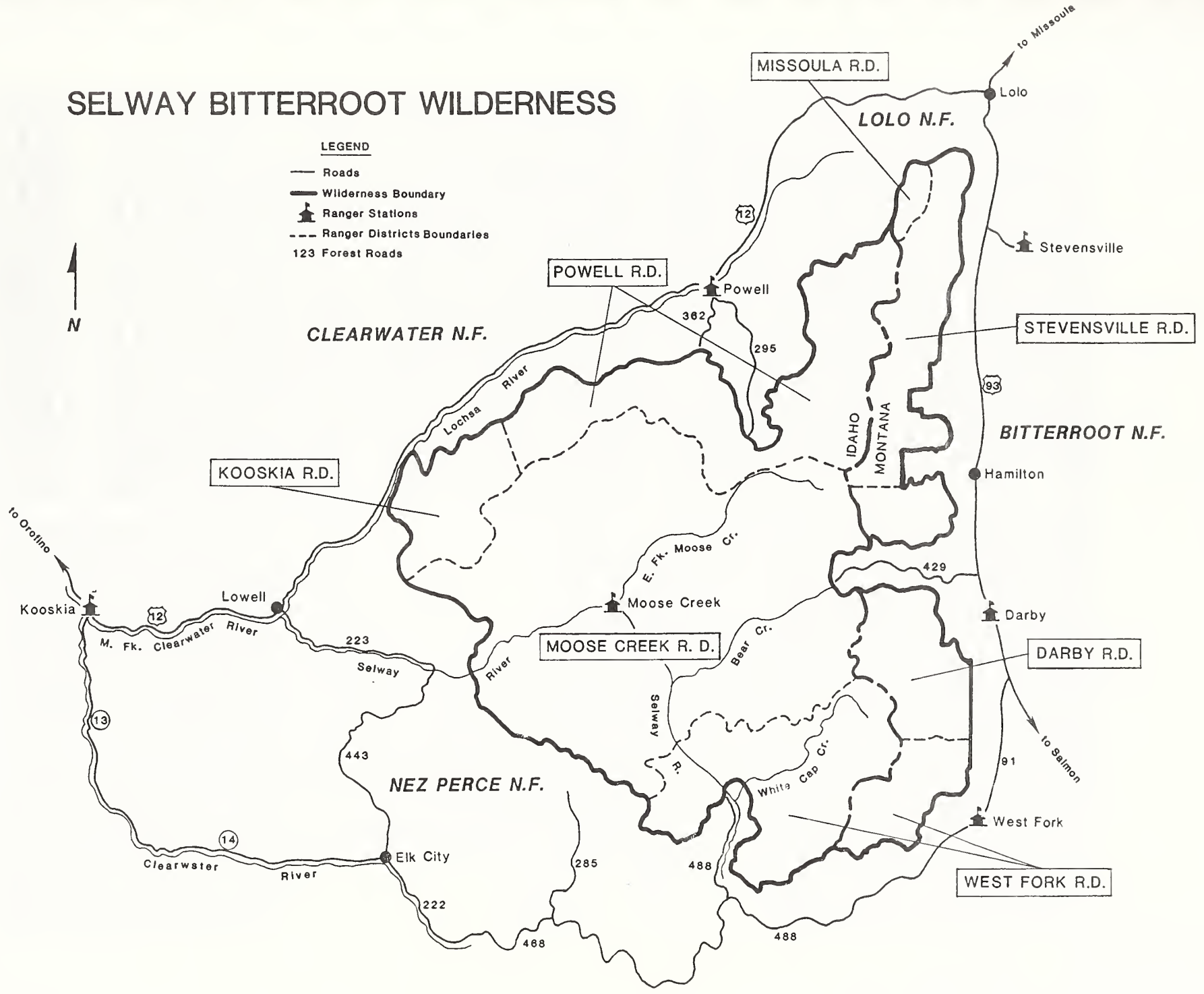
ACCESS AND ACCOMMODATIONS

The edges of the SBW are approached within a few km at many locations by unimproved or graded forest roads. On the east side of the SBW, approach roads branch off from U.S. Highway 93 in the Bitterroot Valley. Approach on the north side is provided by roads that join U.S. 12, and on the south side by the primitive forest road connecting Elk City, ID, and Darby, MT . Access to the SBW itself is provided by an extensive network of hiking and horse trails leading from these roads. Primitive campsites (without shelters or other facilities) are located at frequent intervals along the trails. There is no commercial lodging, but several outfitters and guides are available to cater trips or to transport supplies. Three primitive mountain airstrips (Moose Creek, Shearer, and Fish Lake) are open for public use. Whitewater boating is available on the Selway River under a reservation and permit system. A small scale (1:100,000) topographic map of the SBW is available for $1 at national forest offices, and detailed topographic maps (1:24,000) are available from the U.S. Geological Survey and at retail outlets.

PHYSICAL AND CLIMATIC CONDITIONS

The SBW can be divided into two geomorphic units. One is the Bitterroot Range, whose alpine crest trends north and south in the eastern portion of the Wilderness. The Bitterroot Range is characterized by a series of east/west U-shaped valleys that resulted from Pleistocene glaciation. Tongues of ice extended down both sides of the Bitterroot Divide to about 1200 m (4,000'), and receded about 12,000 years ago. Knife-edged ridges, cirque lakes, moraines, and polished bedrock are common glacial features. In contrast, the western portion of the SBW is characterized by a "bewildering maze" of heavily-forested, steep mountain ridges and deeply-incised stream canyons.

The quartz-monzonite mass composing the Bitterroot Range and most of the mountainous terrain to the west represents the northern extension of the great, granitic Idaho Batholith. The eastern slopes of the Bitterroot Range are underlain by a complex series of schists and gneisses which resulted from metamorphism of the Belt Supergroup by the intrusion of the Idaho Batholith. The western section of the SBW is underlain by metasedimentary Belt Series rocks.


SELWAY BITTERROOT WILDERNESS
LEGEND
Roads
Wilderness Boundary
Ranger Stations
Ranger Districts Boundaries
123 Forest Roads
N
MISSOULA R.D.
POWELL R.D.
KOOSKIA R.D.
MOOSE CREEK R. D.
STEVENSVILLE R.D.
DARBY R.D.
WEST FORK R.D.
LOLO N.F.
CLEARWATER N.F.
NEZ PERCE N.F.
BITTERROOT N.F.
IDAHO
MONTANA
to Missoula
Lolo
Stevensville
Powell
Hamilton
Darby
West Fork
to Salmon
to Orofino
Kooskia
Lowell
Moose Creek
Elk City
Lochsa River
M. Fk. Clearwater River
Selway River
E. Fk. Moose Cr.
Bear Cr.
White Cap Cr.
Clearwater River
362
295
223
443
285
222
468
488
429
91
12
13
14
93

The climate ranges from "inland maritime" in northwestern portions to a more continental "rain shadow" climate in the southern and eastern parts. Average annual precipitation is about 100 cm (40") at 600 m (2000') elevation along the Selway River in the northwest; whereas it decreases upstream to less than 65 cm (25") immediately south of the SBW. At elevations above 1800 m (6000'), annual precipitation is generally 125 to 180 cm (50 to 70"), except in the southern and eastern portions, where it is less. During most years, residual snowpack lingers at the highest elevations until mid-July. Overall, the climate is cool and moderately moist except for a hot dry period in July and August. Thunderstorms are common during this period as are lightning fires.

ECOLOGIC VALUES

The SBW supports the following forest habitat type series (potential climax):

Pinus ponderosa h.t.s (quite restricted)
Pseudotsuga menziesii h.t.s (abundant)
Abies grandis (abundant)
Thuja plicata (not in the southern or eastern portions)
Abies lasiocarpa (abundant)

SAF Forest Cover Types include:

237: Interior ponderosa pine
210: Interior Douglas-fir
218: Lodgepole pine
212: Western larch (northern portion)
213: Grand fir
228: Western redcedar
206: Engelmann spruce-subalpine fir
208: Whitebark pine (includes alpine larch)

Other distinctive vegetative types include montane bunchgrass balds (*Festuca viridula*, *F. idahoensis*, *Agropyron spicatum*), alpine tundra and fellfield communities (atop the Bitterroot Range), and talus and other rockland vegetation. There are also large areas of seral shrubfields resulting from past fires; these contain *Acer glabrum*, *Amelanchier alnifolia*, *Ceanothus sanguineus*, *C. velutinus*, *Holodiscus discolor*, *Philadelphus lewisii*, *Physocarpus malvaceus*, *Prunus emarginata*, *P. virginiana*, *Rubus parviflorus*, and *Salix scouleriana*. Pacific coast species such as *Adiantum pedatum* (maidenhair fern) and *Asarum caudatum* (wild ginger) are common in the SBW and northward in Idaho. Groves of giant old *Thuja plicata* are well developed in some of the tributaries of the Selway River.

Rare plant species include *Draba apiculata* var. *daviesiae*, *Penstemon lemhiensis*, *Waldsteinia idahoensis*, *Synthyris platycarpa*, *Dasynotus daubenmirei*, *Cardamine constancei*. According to botanist Klaus Lackschewitz of Missoula, MT, the following additional species of the SBW are endemic to this general area of Idaho and Montana–*Lesquerella humilis* and *Saxifraga tempestiva*; the following are endemics of a limited area in Idaho and Montana–*Cymopterus sp. nova*, *Allium simillimum*, *Castilleja covilleana*, *Erigeron evermannii*, *Penstemon flavescens*; and the following are rare plants– *Lewisia columbiana* var. *wallowensis*, *Polystichum scopulinum*, *Agrostis borealis*, *Allotropa virgata*, *Carex misandra*, *Juncus covillei* var. *obtusatus*, *Athysanus pusillus*, *Eriogonum pyrolifolium* var. *coryphaeum*, *Eupatorium occidentale*, *Mertensia bella*, *Sedum debile*, and *Linanthastrum nuttallii*.

Aquatic and riparian habitats are numerous and include oligotrophic, snow-fed streams and alpine lakes as well as shallow ponds, wet meadows, and a few bogs. A large part of the SBW is within the Selway River drainage, which is an anadromous fishery. The lake fishery in the SBW was very limited before fish plants were made; it consisted mostly of native cutthroat trout that could get up streams without obstructions and into some lakes. The planting was quite successful in some lakes, which have then continued to maintain populations of westslope cutthroat, Yellowstone cutthroat, rainbow, or eastern brook trout. Many lakes in the SBW are barren.

Wildlife is diverse, reflecting the variety of habitats and vastness of the SBW. Ungulates include elk, white-tailed deer, mule deer, Shira's moose, mountain goat, and bighorn sheep. Rodents and lagomorphs include porcupine, beaver, muskrat, hoary and yellow-bellied marmots, pocket gophers, ground squirrels, red squirrel, chipmunks, mice, voles, woodrat, pika, mountain cottontail, and snowshoe hare. Carnivores include black bear, mountain lion, lynx, bobcat, coyote, otter, badger, wolverine, fisher, pine marten, mink, short-tailed and long-tailed weasels, spotted skunk, and striped skunk.

There are about 200 species of birds that spend at least part of the year in the SBW. Raptors include the goshawk, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, golden eagle, osprey, prairie

falcon, and merlin. Owls include the screech, flammulated, great-horned, pygmy, great gray, long-eared, boreal, and saw-whet. A great diversity of insect eating and seed eating birds is found. Blue, spruce, and ruffed grouse are year-round residents. There are also many birds associated with aquatic environments: ducks, geese, loons, grebes, shore birds, kingfishers, and dippers.

The following are a few references that describe various aspects of the SBW:

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APPENDIX A. SCIENTIFIC NAMES OF TREES

Alpine larch - *Larix lyallii*

Aspen - *Populus tremuloides*

Black cottonwood - *Populus trichocarpus*

Bog birch - *Betula glandulosa*

Common juniper - *Juniperus communis*

Douglas-fir - *Pseudotsuga menziesii* var. *glauca*

Engelmann spruce - *Picea engelmannii*

Flowering dogwood - *Cornus nuttallii*

Grand fir - *Abies grandis*

Green ash - *Fraxinus pennsylvanica*

Mountain alder - *Alnus incana*

Mountain hemlock - *Tsuga mertensiana*

Limber pine - *Pinus flexilis*

Lodgepole pine - *Pinus contorta* var. *latifolia*

Mountain alder - *Alnus incana*

Narrowleaf cottonwood - *Populus angustifolia*

Paper birch - *Betula papyrifera*

Plains cottonwood - *Populus deltoides*

Ponderosa pine - *Pinus ponderosa* var. *ponderosa*

Red alder - *Alnus rubra*

Rocky Mountain juniper - *Juniperus scopulorum*

Sitka alder - *Alnus sinuata*

Subalpine fir - *Abies lasiocarpa*

Water birch - *Betula occidentalis*

Western white pine - *Pinus monticola*

Western hemlock - *Tsuga heterophylla*

Western larch - *Larix occidentalis*

Western redcedar - *Thuja plicata*

Western yew - *Taxus brevifolia*

Whitebark pine - *Pinus albicaulis*

White alder - *Alnus rhomifolia*

APPENDIX B. FOREST HABITAT TYPE ABBREVIATIONS:

1. Pinus flexilis (Pifl) Climax Series

Pifl/Pssp h.t. (Pifl/Agsp)	Pinus flexilis/Pseudoroegneria spicata (Pinus flexilis/Agropyron spicatum)	limber pine/bluebunch wheatgrass
Pifl/Feid h.t.	Pinus flexilis/Festuca idahoensis	limber pine/Idaho fescue

2. Pinus ponderosa (Pipo) Climax Series:

Pipo/And h.t.	Pinus ponderosa/Andropogon spp.	ponderosa pine/bluestem
Pipo/Pssp h.t. (Pipo/Agsp)	Pinus ponderosa/Pseudoroegneria spicata (Pinus ponderosa/Agropyron spicatum)	ponderosa pine/bluebunch wheatgrass
Pipo/Feid h.t.	Pinus ponderosa/Festuca idahoensis	ponderosa pine/Idaho fescue
Pipo/Putr h.t.	Pinus ponderosa/Purshia tridentata	ponderosa pine/bitterrbrush
Pipo/Syal h.t.	Pinus ponderosa/Symphoricarpos albus	ponderosa pine/snowberry

3. Pseudotsuga menziesii (Psme) Climax Series:

Psme/Pssp h.t. (Psme/Agsp)	Pseudotsuga menziesii/Pseudoroegneria spicata (Pseudotsuga menziesii/Agropyron spicatum)	Douglas-fir/bluebunch wheatgrass
Psme/Feid h.t.	Pseudotsuga menziesii/Festuca idahoensis	Douglas-fir/Idaho fescue
Psme/Fesc h.t.	Pseudotsuga menziesii/Festuca scabrella	Douglas-fir/Rough fescue
Psme/Vaca h.t.	Pseudotsuga menziesii/Vaccinium caespitosum	Douglas-fir/dwarf huckleberry
Psme/Phma h.t.	Pseudotsuga menziesii/Physocarpus malvaceus	Douglas-fir/ninebark
Psme/Vagl h.t.	Pseudotsuga menziesii/Vaccinium globulare	Douglas-fir/blue huckleberry
Psme/Libo h.t.	Pseudotsuga menziesii/Linnaea borealis	Douglas-fir/twinflower
Psme/Syal h.t.	Pseudotsuga menziesii/Symphoricarpos albus	Douglas-fir/snowberry
Psme/Caru h.t.	Pseudotsuga menziesii/Calamagrostis rubescens	Douglas-fir/pinegrass
Psme/Cage h.t.	Pseudotsuga menziesii/Carex geyeri	Douglas-fir/elk sedge
Psme/Spbe h.t.	Pseudotsuga menziesii/Spiraea betulifolia	Douglas-fir/white spirea
Psme/Syor h.t.	Pseudotsuga menziesii/Symphoricarpos oreophilus	Douglas-fir/mtn snowberry
Psme/Vasc h.t.	Pseudotsuga menziesii/Vaccinium scoparium	Douglas-fir/grouse wortleberry
Psme/Eqar h.t.	Pseudotsuga menziesii/Equisetum arvense	Douglas-fir/horsetail

4. Abies grandis (Abgr) Climax Series:

Abgr/Libo h.t.	Abies grandis/Linnaea borealis	grand fir/twinflower
Abgr/Spbe h.t.	Abies grandis/Spiraea betulifolia	grand fir/white spirea
Abgr/Clun h.t.	Abies grandis/Clintonia uniflora	grand fir/queencup beadlily
Abgr/Xete h.t.	Abies grandis/Xerophyllum tenax	grand fir/beargrass
Abgr/Asca h.t.	Abies grandis/Asarum caudatum	grand fir/wild ginger
Abgr/Phma h.t.	Abies grandis/Physocarpus malvaceus	grand fir/ninebark
Abgr/Adpe h.t.	Abies grandis/Adiantum pedatum	grand fir/maidenhair fern
Abgr/Cooc h.t.	Abies grandis/Coptis occidentalis	grand fir/western goldthread
Abgr/Eqar h.t.	Abies grandis/Equisetum arvense	grand fir/horsetail
Abgr/Setr h.t.	Abies grandis/Senecio triangularis	grand fir/arrowleaf groundsel

5. Picea spp. Climax Series:

Picea/Clun h.t.	Picea spp./Clintonia uniflora	spruce/bead lily
Picea/Libo h.t.	Picea spp./Linnaea borealis	spruce/twinflower

6. Thuja plicata (Thpl) Climax Series:

Thpl/Adpe h.t.	Thuja plicata/Adiantum pedatum	western redcedar/maidenhair fern
Thpl/Clun h.t.	Thuja plicata/Clintonia uniflora	western redcedar/beadlily
Thpl/Atfi h.t.	Thuja plicata/Athyrium filix-femina	western redcedar/lady fern
Thpl/Gydr h.t.	Thuja plicata/Gymnocarpium dryopteris	western redcedar/oak fern
Thpl/Asca h.t.	Thuja plicata/Asarum caudatum	western redcedar/wild ginger
Thpl/Opho h.t.	Thuja plicata/Oplopanax horridum	western redcedar/devil's club

7. Tsuga heterophylla (Tshe) Climax Series:

Tshe/Clun h.t.	Tsuga heterophylla/Clintonia uniflora	western hemlock/beadlily
Tshe/Asca h.t.	Tsuga heterophylla/Asarum caudatum	western hemlock/ wild ginger
Tshe/Atfi h.t.	Tsuga heterophylla/Athyrium filix-femina	western hemlock/lady fern
Tshe/Gydr h.t.	Tsuga heterophylla/Gymnocarpium dryopteris	western hemlock/oak fern
Tshe/Opho h.t.	Tsuga heterophylla/Oplopanax horridum	western hemlock/devil's club
Tshe/Libo h.t.	Tsuga heterophylla/Linnaea borealis	western hemlock/twinflower
Tshe/Pamy h.t.	Tsuga heterophylla/Pachistima myrsinites	western hemlock/mountain lover

8. Tsuga mertensiana (Tsme) Climax Series:

Tsme/Xete h.t.	Tsuga mertensiana/Xerophyllum tenax	mountain hemlock/beargrass
Tsme/Mefe h.t.	Tsuga mertensiana/Menziesia ferruginea	mountain hemlock/menziesia
Tsme/Luhi h.t.	Tsuga mertensiana/Luzula hitchcockii	mountain hemlock/smooth woodrush
Tshe/Phme h.t.	Tsuga mertensiana/Phyllodoce empetriformis	mountain hemlock/mountain heath

9. Abies lasiocarpa (Abla) Climax Series:

Abla/Pamy h.t.	Abies lasiocarpa/Pachistima myrsinites	subalpine fir/mountain lover
Abla/Clun h.t.	Abies lasiocarpa/Clintonia uniflora	subalpine fir/bead lily
Abla/Xete h.t.	Abies lasiocarpa/Xerophyllum tenax	subalpine fir/ beargrass
Abla/Mefe h.t.	Abies lasiocarpa/Menziesia ferruginea	subalpine fir/menziesia
Abla/Vasc h.t.	Abies lasiocarpa/Vaccinium scoparium	subalpine fir/grouse wortleberry
Abla/Caca h.t.	Abies lasiocarpa/Calamagrostis canadensis	subalpine fir/bluejoint
Abla/Luhi h.t.	Abies lasiocarpa/Luzula hitchcockii	subalpine fir/smooth wood-rush
Abla/Caru h.t.	Abies lasiocarpa/Calamagrostis rubescens	subalpine fir/pinegrass
Abla/Cabi h.t.	Abies lasiocarpa/Caltha biflora	subalpine fire/marsh marigold
Abla/Cooc h.t.	Abies lasiocarpa/Coptis occidentalis	subalpine fir/westrern goldthread
Abla/Stam h.t.	Abies lasiocarpa/Streptopus amplexifolius	subalpine/twisted stalk
Abla/Rimo h.t.	Abies lasiocarpa/Ribes montigenum	subalpine fir/mountain gooseberry
Abla/Vagl h.t.	Abies lasiocarpa/Vaccinium globulare	subalpine fir/blue huckleberry

10. Upper Subalpine/Timberline Climax Series:

Pial h.t.	Pinus albicaulis	whitebark pine
Pial/Abla h.t.	Pinus albicaulis/Abies lasiocarpa	whitebark pine/subalpine fir
Laly/Abla h.t.	Larix lyallii/Abies lasiocarpa	alpine larch/subalpine fir

APPENDIX C. NON-FOREST HABITAT TYPES AND COMMUNITY TYPES:

. Grassland & Shrubland Habitat Types:

Artr/Pssp h.t. (Artr/Agsp)	Artemisia tridentata/Pseudoroegneria spicata (Artemisia tridentata/Agropyron spicatum)	big sagebrush/bluebunch wheatgrass
Artr/Feid h.t.	Artemisia tridentata/Festuca idahoensis	big sagebrush/Idaho fescue
Pssp/Posa h.t. (Agsp/Posa)	Pseudoroegneria spicata/Poa sandbergii (Agropyron spicatum/Poa sandbergii)	bluebunch wheatgrass/Sand. bluegrass
Fesc/Pssp h.t. (Fesc/Agsp)	Festuca scabrella/Pseudoroegneria spicata (Festuca scabrella/Agropyron spicatum)	rough fescue/bluebunch wheatgrass
Fesc/Feid h.t.	Festuca scabrella/Festuca idahoensis	rough fescue/Idaho fescue
Feid/Pssp h.t. (Feid/Agsp)	Festuca idahoensis/Pseudoroegneria spicata (Festuca idahoensis/Agropyron spicatum)	Idaho fescue/bluebunch wheatgrass
Feid/Deca h.t.	Festuca idahoensis/Deschampsia caespitosa	Idaho fescue/tufted hairgrass
Cele/Pssp h.t. (Cele/Agsp)	Cercocarpus ledifolius/Pseudoroegneria spicata (Cercocarpus ledifolius/Agropyron spicatum)	mountain mahogany/bluebunch wheatgrass

2. Community Types:

Glne/Pssp c.t. (Glne/Agsp)	Glossopetalon nevadense/Pseudoroegneria spicata (Glossopetalon nevadense/Agropyron spicatum)	green bush/bluebunch wheatgrass
Mefe/Juco c.t.	Menziesia ferruginea/Juniperus communis	menziesia/common juniper
Potr c.t.	Populus tremuloides	trembling aspen
Potr/Beoc c.t.	Populus tremuloides/Betula occidentalis	trembling aspen/river birch
Alsi c.t.	Alnus sitchensis	Sitka alder
Caca/Caru c.t.	Calamagrostis canadensis/C. rubescens	bluejoint/pinegrass